

COAL AGE

Vol. 2

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No. 2

HOW prone we are to let others think and decide for us. We vote as did our fathers, and we worship as blindly. There are questions before us today that are eating at the heart of all industry. Coal-mine officials, of all men, should walk in the forefront of modern-day thought. No other employers are more closely united, or more vitally dependent on that great army of men who work with their hands rather than with their heads.

Let us be honest with this great body of workers, for business, if not for moral reasons. A dam can only be built so high, and the higher it goes the greater the ultimate flood. No wall can forever retard the tide of independent thought that is now rising from the toiling masses. 'Tis a wise man who knows when he's riding a runaway, and who decides to guide the animal rather than waste needed strength in futile attempts to stop the beast.

One subject that will early confront American coal operators is the question of a minimum wage for miners. Whether we wish it or not, the problem will be put up to us for solution, just as it has been submitted to the people of other nations. Only a few months ago the English failed to handle the question satisfactorily, and no one need doubt that the minimum-wage specter will again loom large on the British horizon ere many months have passed.

If the poor were the idle and the industrious the rich, there would be no need for further discussion, because the poverty of the idle would make them work. It may be that legislation is the only remedy that will right the evil. Already we have passed many laws requiring a minimum of honesty, respectability, health and education. If we build a house, the law compels us to equip it with certain drains and sanitary provisions, yet it need not be a perfectly healthy home. In the matter of educating our children, there must be a certain minimum, although we are not forced to make our youngsters profound scientists.

The same principle is applicable to wages; that much we frankly concede. But it does not appear to us that there is any occasion to agitate or enact a minimum wage in the coal industries before such legislation is applied to the sweated employments, or

parasitic trades which are practically subsidized, and constitute a positive drain upon society at large.

Investigations have shown that low rates of wages, as distinguished from inadequate earnings, due to sickness or irregular employment, are responsible for nearly one-half the cases of primary poverty. Labor organizations offer no relief to this state of affairs, for even in Great Britain, where workingmen's unions are most widely developed, only about 25 per cent. of the wage-earners are organized.

Opponents of the principle of a minimum wage largely base their belief on the idea that the system encourages indolence, and that the rights of the employer are infringed upon. As the plan has worked out in Australia, these arguments fail to hold. In this latter country the laws provide for the election of joint boards composed of an equal number of employers and employees in all trades, and these special committees have the power to fix minimum wages and maximum hours. In case of a deadlock, the chairman who has been chosen by the representatives decides the dispute.

All awards are enforced by law, but any act, by common consent, can be altered. No employer is compelled to continue his business, or to engage any workman; but if he chooses to do so, he must, as a minimum, comply with the specified conditions, just as he must observe sanitary regulations, or other provisions of factory and industrial acts. No workman is compelled to enter into employment or is forbidden to strike for better terms, but he is prevented from engaging himself for less than the minimum wage.

Coal mining, like many other legitimate vocations, is suffering from the advantage gained by those unscrupulous employers in other trades who engage large numbers of women and children and pay them the lowest wages. These parasitic industries exercise an evil power over the distribution of the nation's labor force, and draw capital into undesirable channels. Minimum-wage laws in the United States might bless rather than curse the coal business. Clouds that look black at a distance are invisible when we get to them. Honesty is a far better quality than nervousness.

The Burnwell Coal Co. in Illinois

Special Correspondence

On the front cover of this week's issue appears an illustration of the Burnwell Coal Co.'s, Mine No. 2, in Montgomery County, Ill. This company has two large shaft mines and is one of the most important operating companies in this district. The mines are located at Witt, about 60 miles east of St. Louis and 200 miles south and a little east of Chicago. There are two railroads entering the field the Cleveland, Cincinnati, Chicago & St. Louis and the Chicago and Eastern Illinois.

GENERAL CONDITIONS

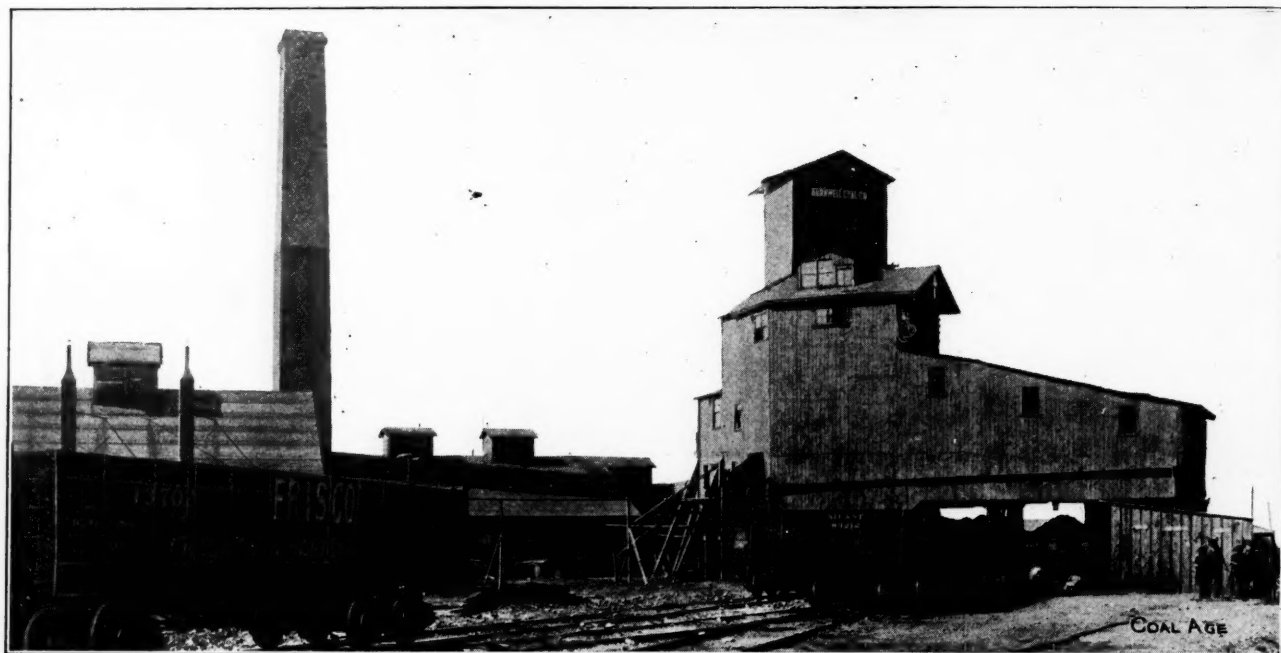
While the coal production in Illinois appears to be at a standstill, the produc-

A brief description of an Illinois company operating in a field adjacent to St. Louis. The coal worked is the No. 6 seam, which averages about 8 ft. thick. The panel system of mining is used, and mule haulage is being replaced by electricity. The company has one of the most modern plants in Illinois and is an important producer.

could, however, be readily increased to 2000 tons by installing electric haulage. There is sufficient development in No. 2 mine to make possible a production of 3000 tons per day. This mine is equipped with electric haulage and the capacity will, no doubt in the near future, be brought up to about 3500 tons per day.

The seam worked in both of these mines is that described by the State Geological Survey as the No. 6. This seam measures about 8 ft. in height and no faults or rolls have been encountered in either mine. On the contrary, in No. 2 mine the seam often attains a thickness of 9 ft. or 9 ft. 6 inches.

There is a small blue band in this coal



GENERAL VIEW OF THE SURFACE EQUIPMENT AT THE BURNWELL NO. 1 MINE

tion of Montgomery County shows a steady and consistent increase during the last few years. The production for the entire state was as follows: In 1910, 45,900,246 tons; 1909, 50,904,990 tons; 1908, 47,659,690 tons; and in 1907, 51,317,146 tons. It will be seen from this that the state had its maximum production in 1907, which was nearly equaled in 1909, while 1908 and 1910 both show a decided loss.

On the other hand, Montgomery County shows a steady increase in production over this same period, the output being as follows: 1907, 1,289,021; 1908, 1,410,978; 1909, 1,780,668; 1910, 1,799,720.

The average price obtained for the Montgomery County product during 1910, was \$1.06, being somewhat below that of the average for the entire state, which was \$1.14. The average number of em-

ployees in this county during the same year was 2374, as compared with 72,645 for the entire state.

THE BURNWELL COMPANY

Shaft No. 1 of this company was sunk in 1900 and in the period from July, 1900, to July, 1901, 140,000 tons were produced. During the same period of 1907-1908, there were 258,000 tons produced and from Jan. 1, 1911, to Jan. 1, 1912, the production amounted to 263,000 tons. The total production up to Jan. 1, of the current year, has been 2,194,000 tons. Shaft No. 2 of this company was not sunk until 1906 and during the year of 1911 there was produced from the shaft 389,000 tons. The total production up to Jan. 1, 1912, amounted to 1,016,800 tons.

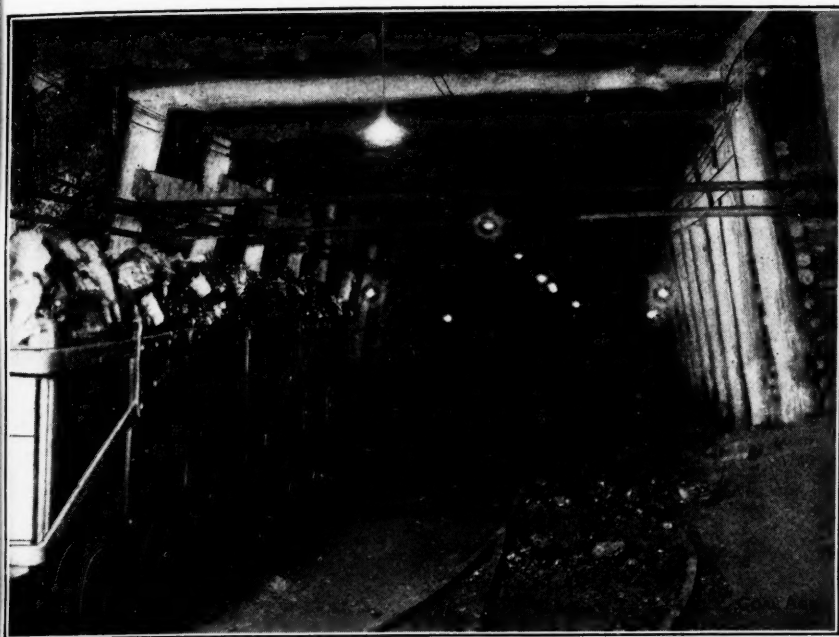
The capacity of No. 1 mine at the present time is 1800 tons per day. This

which in No. 1 mine runs from 2 to 6 in. in thickness, and some of this usually becomes mixed in with the coal; in No. 2 mine this band is somewhat thicker. The coal carries a few sulphur streaks but the coal mined is usually blocky, is not powder shattered and makes a large percentage of lump.

MINING CONDITIONS

The depth of the shaft at No. 1 mine is 534 ft., while that at No. 2 mine is 584 ft. The former is of sufficient size to accommodate a car of 4500 lb. capacity, and the latter one of 8000 tons capacity.

The No. 1 mine of this company was originally opened up on the cross entry system but under this method had a squeeze. The squeezed area was driven through and the present development is now on the panel system. The main and



BOTTOM OF THE BURNWELL NO. 2 MINE, LOOKING WEST

cross entries are well protected by barrier pillars and any possibility of squeeze in the future has been eliminated.

The No. 2 mine was developed from the start on the panel system as will be noted on the accompanying map. As soon as the panel is completed the room pillars are drawn and the roof allowed to come in, which relieves the weight on the entry pillars and eliminates the possibility of a squeeze as well as the necessity of ventilating the old works; it

also gives a large percentage of extraction and, consequently, cheap coal. The main and cross entries are protected with 100-ft. barrier pillars.

This mine at one time had a gob fire. The panel in which this occurred has now been sealed off and the stoppings show no indication of heat, so that no danger is anticipated from this source.

HAULAGE AND MINING

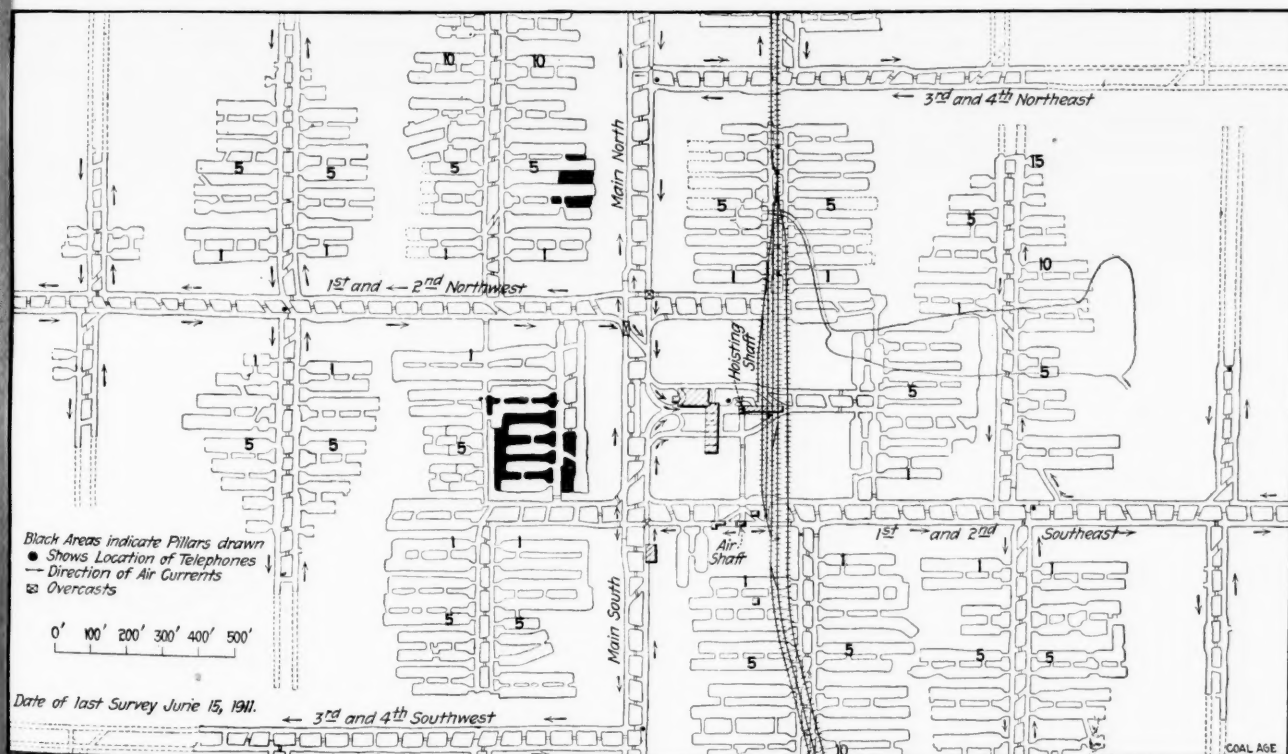
The haulage in No. 1 mine is done en-

tirely by mules, and since the hauls are now becoming comparatively long, it would seem advisable to install some form of mechanical haulage. Mule haulage was also used until quite recently in the No. 2 mine, but electric haulage has now been installed.

Mining in both of these shafts is done entirely by hand, which is contrary to the practice in most of the Western mines. The undercutting is done in the blue band before mentioned, which is extracted and thrown in the gob. The miners do their own shooting and it requires about two pounds of powder to shoot one room; there are two men assigned to each room. The coal makes a large percentage of lump; the 1¼-in. screenings amount to approximately 25 per cent.

The roof conditions at these mines are about on an average with those generally in Illinois. On top of the coal occurs a black slate varying from 2 in. to 5 ft. in thickness and above this is a cap rock showing in places a thickness of 10 ft. The slate is usually taken down in the main haulageways but timbered in the cross entries and panels. The roof in general is considered very safe.

In the No. 2 mine the top coal is left up in some sections, and this makes a very excellent roof requiring no timbering; under these conditions it will stand indefinitely. Where this is done the entry men receive 75c. per lineal yard. The bottom is of fireclay which varies from 2 in. to 2 ft. in thickness, probably averaging the latter amount in the No. 1 mine.



MAP OF A PORTION OF THE BURNWELL COAL CO.'S NO. 2 MINE, AT WITT, ILL.

This fireclay gradually merges into boulders and hard shale.

The grade in neither of these mines averages more than 1 per cent. As before mentioned, there are no rolls of any kind which would cause excessively steep grades and the gathering can be readily done by mules. With large capacity cars, say of 4 tons, it would, however, probably be more economical to gather with motors.

In the No. 1 mine it is the intention of

the management to have new main entries running east and west completely developed within a year, at the end of which time all coal will be coming from one side. By this means the ventilation will be improved and some economy in handling the coal at the bottom effected.

The railroad tracks at these mines were built by the coal company and deeded to the Chicago & Eastern Illinois and the Big Four railroads. These two companies have a traffic agreement

whereby equipment may be supplied by either one, or both.

The shafts are timbered with 6x12-in. buntons and 4-in. lagging. The top equipment at the No. 2 mine is fireproof and modern in every respect, and will no doubt easily last the life of the mine.

The main roads at these mines are laid with 40-lb. steel and the cross entries with 30-lb. The entries are driven straight and haulage roads without exception kept up in good condition.

Beginning of Anthracite Coal Trade

By William Griffith *

The frequently published statistics of shipments of anthracite coal from Pennsylvania, and notably those published by the Bureau of Anthracite Statistics of New York, begin with the shipment of 365 tons from the Lehigh region in 1820, the inference being that the anthracite trade originated at Mauch Chunk, in the Lehigh region. This, of course, is incorrect, and therefore it may not be amiss to set down a few facts in connection with the actual beginnings of the anthracite coal trade of Pennsylvania.

In 1776, coal was shipped down the Susquehanna River from the Wyoming Valley to Harrisburg, and hauled in wagons to Carlisle, Penn., for use in connection with the manufacture of fire arms. These shipments were continued during the Revolutionary War, and other consignments were made from time to time until about 1807. These early shipments of anthracite were for use in blacksmith forges, for it was not then known that it was possible to burn this coal in any other way than by using forced draft. Of course, no very extensive trade could exist under such conditions.

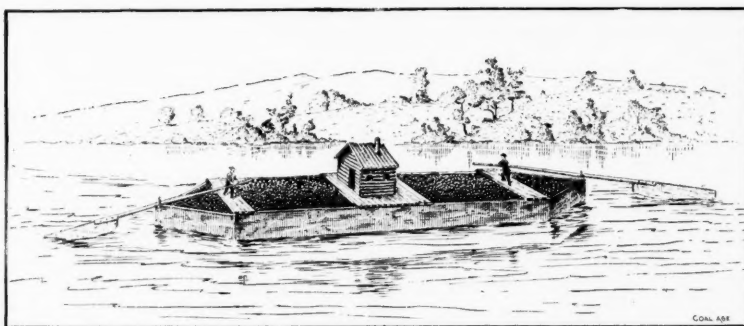
On Feb. 11, 1808, Judge Jesse Fell, of Wilkes Barre made his famous experiment, whereby he discovered that anthracite would burn in an ordinary grate, without forced draft, and thus laid the foundation for an extensive coal trade. The knowledge of this experiment and its results quickly spread throughout the Wyoming Valley, and every house was soon supplied with its coal-burning grate.

John and Abijah Smith, two young men from Derry, Connecticut, had moved into the Wyoming Valley and begun mining coal. In 1807 they shipped 55 tons down the Susquehanna River to Columbia, Penn. Their mine was at Plymouth, and they had formed the coal mining firm of Abijah Smith & Co.

These enterprising Yankees were quick to take advantage of Judge Fell's discovery. They continued their business of shipping coal in arks by the Susquehanna River to Columbia, Baltimore and

Published statistics imply that the first shipments of anthracite coal in Pennsylvania were made from the Lehigh region in 1820. Mr. Griffith points out that previous to this, coal had been shipped from the Wyoming Valley for a number of years.

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TYPE OF ARK IN WHICH ANTHRACITE COAL WAS FIRST SHIPPED

other river points, and accompanied their cargoes in person, taking with them tools, grates, and workmen skilled in setting up the latter. The two Smiths installed these grates in private houses and other places and taught the people how to burn the coal. They extended their territory by re-shipping at Havre de Grace, Md., in coastwise vessels.

Local histories contain the following letter and account current from Price & Waterbury, the first coal merchants of New York City, which in this connection is a very interesting paper, illustrating as it does, not only the indomitable energy of this pioneer anthracite coal firm, but also the condition and amount of the anthracite trade in the great city of New York at that early date.

New York, February, 1813

Messrs. Abijah Smith Co.

Gentlemen:—Having lately taken a view of the business we have been conducting for you this sometime past, we thought it would be

gratifying to have the account forwarded, and therefore present you with a summary of it up to the 18th of January, 1813, containing first, the quantity of coal sold, and to whom; second, the amount of cash paid us from time to time; third, the amount of interest cash on the various sums advanced; the credit of interest on the sums received, and lastly, the quantity of coal remaining on hand unsold. Should you on the receipt of this find any of the items incorrect, we need hardly observe that the knowledge of such an error will be corrected with the greatest pleasure. As it respects our future plan of procedure, we shall expect to see one of your concern in the city sometime in the spring, when a new arrangement may be fixed upon. Our en-

deavors to establish the character of the coal shall not at any time be wanting, and we calculate shortly to dispose of the remaining parcels of coal unsold.

1812:

By cash of Doty & Willets, for 5 chaldrons of coal	\$100.00
By cash of John Withington, for 5 chaldrons of coal	100.00
By cash of Coulthaid & Son, for 10 chaldrons of coal	200.00
By John Benham's note, 90 days, for 10 chald. of coal	200.00
By cash G. P. Lorrillard, for 1 chaldron of coal	20.00
By cash of J. J. Wilson, for 4 chaldrons of coal	80.00

June 13:

By cash of Doty & Willets, for 5 chaldrons of coal	100.00
By cash of G. P. Lorrillard, for 11½ chaldrons of coal	230.00
By A. Frazier's note, 90 days, for 25 chaldrons of coal	475.00
By cash received of T. Coulthaid, for 5 chaldrons of coal	100.00
By M. Womas' note, 90 days, for 20 chaldrons of coal	380.00
By half measurement received for 9 bushels of coal	6.25
By B. Ward and T. Blagge, for 1¼ chaldrons, at \$20 per c.	25.00
By Wittingham, for ½ chaldron of coal	10.00

June 25, by Pierpont, for ½ chaldron of coal	11.00
June 25, by Mr. Landis, for ½ chaldron of coal	12.00
July 16, by Robert Barney, for 17½ chaldrons of coal, at \$22 per chaldron	385.00
Sept. 15, by cash for ½ chaldron of coal	12.50
Oct. 9, by William Colman, for ½ chaldron of coal	12.50
Oct. 9, by Sexton & Williamson, for 1½ chaldrons of coal	37.50
Oct. 24, by cash for 1 chaldron of coal	25.00
Oct. 29, by cash for ½ chaldron of coal	12.50
Nov. 7, by cash for ½ chaldron of coal	12.50
Nov. 12, by cash for 1 chaldron of coal	25.00
Nov. 16, by Mr. A. Le Briton, for 12 chaldrons of coal at \$25 per chaldron	288.50
Dec. 5, by cash for ½ chaldron of coal	12.50

erly operated by Abijah Smith & Co. still exists at the head of Coal St., in the Borough of Plymouth, Penn., where it may easily be inspected by any one who cares to drive along the highway, which passes close to its entrance. The accompanying photograph shows the present condition of this oldest and first anthracite mine to maintain a continuous production.

About 1814, three gentlemen from Wilkes-Barre, Miner, Sist and Robinson, knowing that coal existed at or near Mauch Chunk, concluded to engage in the anthracite trade from that locality, with the Philadelphia market in view.

found the furnace at white heat, and concluded that the proper way to burn anthracite coal was to shut the furnace door and "let it alone."

These two men became firmly convinced through their first successful effort to use anthracite in the iron industry, that it was a valuable fuel, and in 1815, White, Hazzard & Hauto began negotiations for a lease on the Lehigh Coal Company's land at Mauch Chunk. This lease covered 10,000 acres, for a period of twenty years, the terms being "one ear of corn per year if demanded," etc. After many failures to navigate the rapid and rocky waters of the Lehigh,



MOUTH OF OLD MINE FORMERLY OPERATED BY ABIJAH SMITH & CO., PLYMOUTH, PENN.

Dec. 11, by cash A. Dailey, for ½ chaldron of coal	12.50
Dec. 14, by cash for ½ chaldron of coal	12.00
1813:	
Jan. 4, by cash for 1 chaldron of coal	25.00
Jan. 18, by J. Curtis, for 9 bushels of coal	6.27
By amount of balance this day	763.12
Total	\$3,601.20
Errors excepted, Price & Waterbury.	

Smith & Company continued their trade, increasing it annually, until about 1831. In the year 1820, which the statistics of the Bureau record as the beginning of the trade, there were several mines making regular shipments from the Wyoming region, amounting in all to over 2500 tons annually. The old mine form-

During this year they shipped several boat loads of coal down the Lehigh River, two of which arrived at Philadelphia and were purchased by White & Hazzard for \$21 per ton, and used in their wire mills at the Falls of Schuylkill.

A few wagon loads had arrived in Philadelphia previous to this date, but the coal was discarded by the purchasers, and used up in making walks, the sellers of the coal being denounced as imposters. It is said that White & Hazzard, after ineffectual efforts to make the coal burn by the usual methods employed for handling wood fires, closed their furnace doors in utter disgust and went to their noonday meal. Upon returning they

they eventually succeeded in establishing a business in the transportation of coal from Mauch Chunk down the Lehigh River to Philadelphia, and in 1820, shipped 365 tons.

This coal was mined from open quarries at Summit Hill. Subsequently, as the trade by the Lehigh River increased, canals were built. The first railroad shipments from that section were made in or about 1855.

During all this time the trade from the Wyoming region was continued by Abijah Smith & Co., and others. It was shipped down the stream in Susquehanna River arks, until the building of the Pennsylvania Canal, about 1831. The Dela-

ware & Hudson R. R. first shipped coal from the Carbondale region in 1829. Shipments from Scranton district, were made over the Delaware, Lackawanna & Western, about 1851. Rail shipments from the Wilkes-Barre district began about 1846 and from the Schuylkill region, 850 tons were transported over the Reading railroad, in 1841.

From the foregoing brief account of the beginnings of the anthracite trade it will be noted that previous to 1820, there was a flourishing trade in coal by way of the Susquehanna River, from the Wyoming field, and that two years before coal was first satisfactorily used in Philadelphia it was a commodity in New York City. This latter fact was due to the enterprise of Abijah Smith & Co., the originators and pioneers in the anthracite trade of Pennsylvania, to whom the rightful credit should now be given.

Some Western Statistics for 1911

UTAH

The production of coal in Utah in 1911, according to figures compiled by E. W. Parker, just made public by the U. S. Geological Survey, was 2,513,175 short tons, having a spot value of \$4,-248,666.

This production was about the same as in 1910, the difference being less than 5000 tons. The value increased \$24,110, or a little more than 0.5 per cent. That the production did not show a large decrease and that the value showed any increase at all was due to developments in Emery County, which nearly trebled its production of 1910, 40,657 tons, the output in 1911 being 120,000 tons. The average price for the Emery County product advanced from \$1.98 a ton in 1910 to \$2.09 in 1911.

All the other counties showed decreased production in 1911, and Carbon County, by far the most important producer, showed also a slight decline in price. Summit and Uinta Counties had decreased tonnages but higher prices. In addition to being the most important coal-producing county of the state, Carbon County is the only one in which coke is made. In 1911 a total of 381,696 tons of coal, an increase of 113,891 tons over 1910, was made into coke in Carbon County.

The men employed in the coal mines of Utah in 1911 numbered 3060, who worked an average of 236 days. The average production for each man employed was 821.3 tons in 1911.

The Ninth United States Census recorded the first production of coal in Utah, an output of 5800 tons. Ten years later, the production amounted to less than 15,000 tons. It assumed some im-

portance in 1882, when the production amounted to 100,000 tons, and it reached the million-ton mark in 1900. In 1909, it exceeded 2,000,000 tons.

The following figures show the growth of the industry:

PRODUCTION OF COAL IN UTAH, IN SHORT TONS

1882.....	100,000	1907.....	1,947,607
1890.....	318,159	1908.....	1,846,792
1900.....	1,147,027	1909.....	2,266,899
1905.....	1,332,372	1910.....	2,517,809
1906.....	1,772,551	1911.....	2,513,175

WYOMING

As in most of the other states in the Rocky Mountain region, the coal production of Wyoming was considerably smaller than in 1910, when the record output was obtained, but it was larger than in any other preceding year. Compared with 1909, the output in 1911 showed a normal increase. Coal mining in all the Rocky Mountain states was abnormally stimulated in 1910 by the strike among the miners of the Middle West. Wyoming's production in that year increased more than 1,100,000 tons over 1909, reaching a total of 7,533,088 short tons. With the return to normal conditions in 1911, the production in Wyoming fell off to 6,744,864 short tons, a decrease of 788,224 short tons, or 10.5 per cent.

The value declined from \$11,706,187 to \$10,508,863, a decrease of \$1,197,324, or 10.2 per cent. The difference in the percentage of decrease between quantity and value was not due to any actual advance in price. There was a general decline in values for commercial coal in most of the coal-producing regions, but in Carbon and Sweetwater Counties, where a large part of the product is mined for railroad use by companies affiliated with the transportation interests, the prices were apparently somewhat higher.

The quantity of coal undercut by machines in Wyoming in 1911 was 1,948,589 short tons, or 28.9 per cent. of the total output, against 1,468,994 short tons, or 19.5 per cent. of the total, in 1910.

Companies whose aggregate production amounted to 5,369,342 short tons reported in 1911 that 1,527,913 tons, or 28.4 per cent., was mined by hand and that 1,892,840 tons, or 35 per cent., was shot off the solid, the remainder, 1,948,589 tons, being mined by machines.

NORTH DAKOTA

The production of coal in North Dakota in 1911 was 502,628 short tons, valued at \$720,489. This is the first time in the history of the state that the production has amounted to more than half a million short tons.

North Dakota was one of the few Western states whose production in 1911 exceeded that of 1910, whereas in 1910 it had been the one state of the Rocky Mountain and Great Plains provinces that showed a decrease. The production

in 1911 exceeded that of 1910 by 103,587 short tons, or 25.96 per cent., in quantity, and by \$125,350, or 21.06 per cent. in value.

The total production of coal in North Dakota and the increase in 1911 over 1910 are not of really great importance when compared with the output of coal in most of the other states, east or west, yet both are significant as indicating considerable success in the efforts to utilize this local fuel resource, which is of low grade compared with the coals from other states that are brought into competition with it.

The development and utilization of the lignites of North Dakota, as of Texas, must depend on relatively local markets, for as they disintegrate rapidly on exposure to the atmosphere, they do not bear long transportation and must be used a short time after being mined. Lignite is not a high-grade fuel, and on account of its large moisture content does not reach high temperatures in combustion. It is, therefore, undesirable for steam raising, though it can be used for that purpose in specially constructed furnaces with large grate areas.

Longwall Mining

Longwall mining is best suited to hard seams, free from faults with a roof of hard, tough stone, though it is adaptable wherever stone for packing is easily obtained, also to gaseous mines, as the simplicity of longwall ventilation affords a continuous current at the working face which dilutes the gas as soon as it is given off; the gob, however, is apt to be a source of danger and should be drained of its gas by small roads driven in a short distance, or by bore holes.

This method can be used for seams dipping at any angle. It is also the most practical method for deep mines, as in such mines the excessive tension in the coal seam, due to the enormous depth, makes the pillar-and-room system impossible as the crushing increases the temperature and endangers the mine and miners.

Owing to the presence of water in mines it is usually advisable to work longwall to the rise where the inclination is not too great; if very great, the coal is apt to fall forward on the miner. Under such circumstances, choose a direction somewhere between the line of strike and dip.

Very Deep

By M. YOUNG

Deep down in subterranean cave
Where primal rocks the strata pave—
Good Neighbor Coal and Neighbor Gas
Dropt in the eons' time to pass.

Said Neighbor Gas: "Ah, me! Heigh-ho!"
Said Neighbor Coal: "Why sigh you so?"
Said Gas: "You ask? And yet you see
How all the world makes light of me!"

Two Concrete Lined Mine Shafts

By F. C. Auld*

The value of accurate records of construction quantities, yielding reliable unit costs, is recognized by all progressive construction engineers. In shaft sinking, these records are more than ordinarily difficult to obtain and it is the purpose of this article to outline the construction work and the methods employed for securing cost data in connection with the sinking of two concrete-lined mine shafts in West Virginia.

The Annabelle No. 1 mine of the Four States Coal & Coke Co. is situated on Tavebaugh Creek in Marion County, West Virginia. It is about three miles above the town of Worthington and about twelve miles from Fairmont. The coal is reached by two concrete-lined vertical shafts about 300 ft. deep, one being a circular ventilating shaft, 16 ft. in diameter, and the other an elongated hoisting shaft, 26 ft. 2 in. x 11 ft. 6 in., inside dimensions.

Steel forms in 5-ft. sections were used

Describing the records kept of construction work on two 300-ft. shafts at Annabelle, W. Va. Such records are of great value in yielding reliable unit costs. Certain advantages of the circular form of shaft section were strikingly illustrated by the operations at Annabelle.

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in placing the concrete lining of these shafts and no back filling was done, the entire space between the forms and the excavation being filled with concrete. In some of the softer strata encountered this space was greatly increased by the caving of the sides of the excavation. Figs. 1 and 2 show the designs of the shaft.

THE CONSTRUCTION RECORDS

The final construction records for this work consist of scale drawings showing a vertical cross section of each of the two shafts. The average thickness of the concrete lining for every point in the depth of the shaft is shown to scale. In parallel columns on either side of the shaft sections are recorded the following data for the various levels in the depth of

the shafts to which they apply: Depth in feet below the shaft coping; tidal elevation; nature of the strata encountered; average thickness of concrete lining, in inches; time and date of setting forms; time and date on which the placing of concrete was completed.

The hoist shaft was sunk to a depth of 75 ft. before any concrete was deposited. This 75 ft. was then lined completely, beginning at the bottom of the excavation and finishing with the coping. Excavation was then resumed and an added depth of 51 ft. was sunk before further concreting was done. This procedure was continued throughout the prosecution of the work. It should be noted that, except for the deeper part of the work, concrete was being deposited in one shaft while sinking was being done in the other.

The steel forms used inside the shafts were furnished in 5-ft. lengths. Five sections, or enough to completely line 25 lin.ft. of shaft, were provided for each operation. When excavation was stopped, and concreting was about to be begun, one 5-ft. section of form was placed and levelled and lined up from a plumb line by the engineer. When this form had been filled, another was placed above and resting on it. This was then also leveled and lined up by the engineer. When all five sections had been placed, the bottom section was removed and placed on

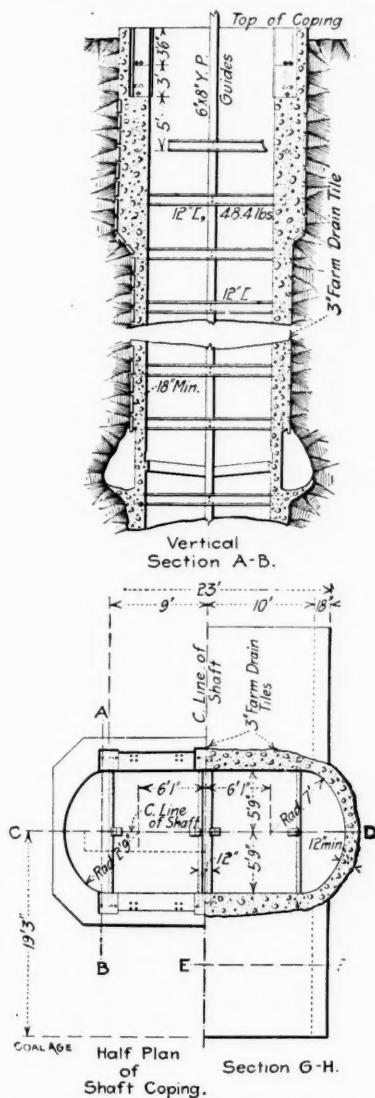


FIG. 1. PLAN AND ELEVATION OF SHAFT

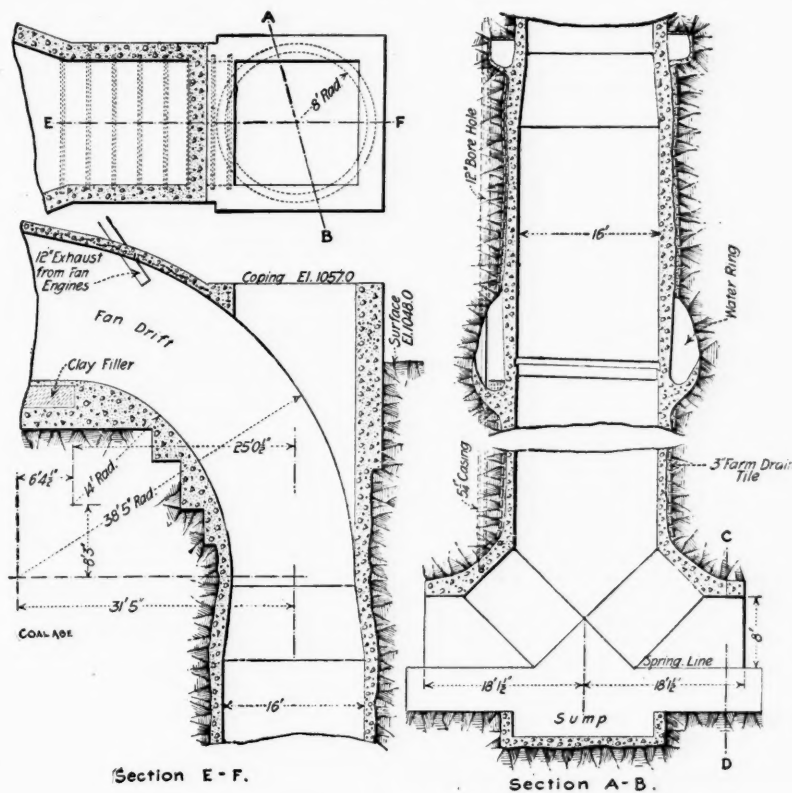


FIG. 2. SECTIONAL VIEWS OF AIR SHAFT AND FAN DRIFT

top, the lower concrete being by this time completely set.

MEASUREMENTS AND NOTES TAKEN WHEN FORMS WERE SET

The necessary measurements and shaft records were taken when the forms were lined up. This allowed ample opportunity for getting the required data in an exact manner with practically no interference to the work. When a form section had been correctly placed for line and level, the elevation of the top of the form was recorded, and the distance between the neat line of forms and the walls of the excavation was measured. This measurement was taken at six points around the circumference or periphery of the top of the forms in the case of the hoist shaft; and at four places in the case of the air shaft. The figures recorded for thickness of the lining walls were the averages of these readings.

At the same time, the nature and thickness of the strata for 5 ft. above the forms were observed and entered in a book in such a manner as to constitute a continuous record. As the readings just referred to, as well as the time of setting forms and placing concrete, were all set down in a field book at the time, this book became a complete record, and in preparing the final diagrammatic report, it was only necessary to compute the averages and transcribe the records.

The time entries furnish an interesting check on the progress of the work and constitute a complete record of the time required for each operation. For instance, the difficulty of setting the larger and more complicated forms of the hoist shaft, each involving the location in exact alignment of four steel buntions, is clearly shown by the records in the longer time required for setting these forms as compared with those of the air shaft.

VALUE OF THE RECORDS

The time required to excavate each "lift" is readily ascertained by comparison of the time of setting forms; thus in the case of the air shaft, the second lift, 71 ft. in depth, was excavated in approximately 36½ days, as the records show that the lower form was set at 11 a.m., Jan. 3, while the corresponding form for the lift above was set at 11 p.m., Apr. 27. Of course, these periods are elapsed time. During sinking, 12 hours were taken off for each Sunday. There were also some delays due to water, waiting for concrete to set and other causes. All concrete was allowed to set at least 48 hours before the forms were drawn.

Summaries of the construction records for each shaft are given in Tables Nos. 1 and 2. These show, in addition to the dates of beginning and completing excavation, the average quantities of excava-

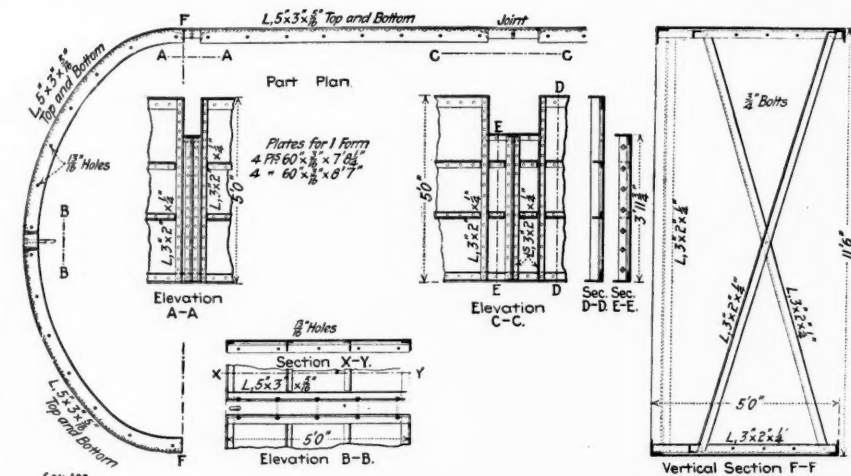


FIG. 3. DETAILS OF STEEL FORMS FOR HOIST SHAFT

tion and concrete work for each day during the different periods of sinking.

On account of the caving of the clay strata which were encountered, as well as the natural irregularities of the excavation, the average quantities per lineal foot of shaft were naturally much larger than the minimum amounts required by the design. This called for a minimum thickness of 13 in. for the air-shaft walls, and in the case of the hoist shaft, for a mini-

mum thickness of 13 in. at the ends and 18 in. at the middle of the sides. The actual quantities of excavation and concrete as compared with the neat quantities called for by the design, are shown in Table No. 3.

ADVANTAGES OF THE CIRCULAR SHAFT

Since both of these shafts were excavated through practically the same material, being a distance of only 517 ft.

TABLE NO. 1. AIR SHAFT

Lift	Depth	Excavation		Daily Average				Remarks
		Begun	Finished	Excavation		Concrete		
				Lin.Ft.	Cu.Yd.	Lin.Ft.	Cu.Yd.	
1	52	Apr. 5	Apr. 25	2 6	28.4	5.8	20.7	Wood forms
2	69	May 5	May 31	2 9	34.0	6.2	27.7	2 days lost
3	68	June 17	July 13	2 9	31.6	11.3	36.1	3 days lost
4	46	July 21	Aug. 7	2 6	25.4	11.5	28.8	1 day lost excavating
5	47	Aug. 12	Aug. 29	2 8	28.5	11.8	33.8	
6								

Average for entire shaft, 2.5 ft. sunk and lined per day.

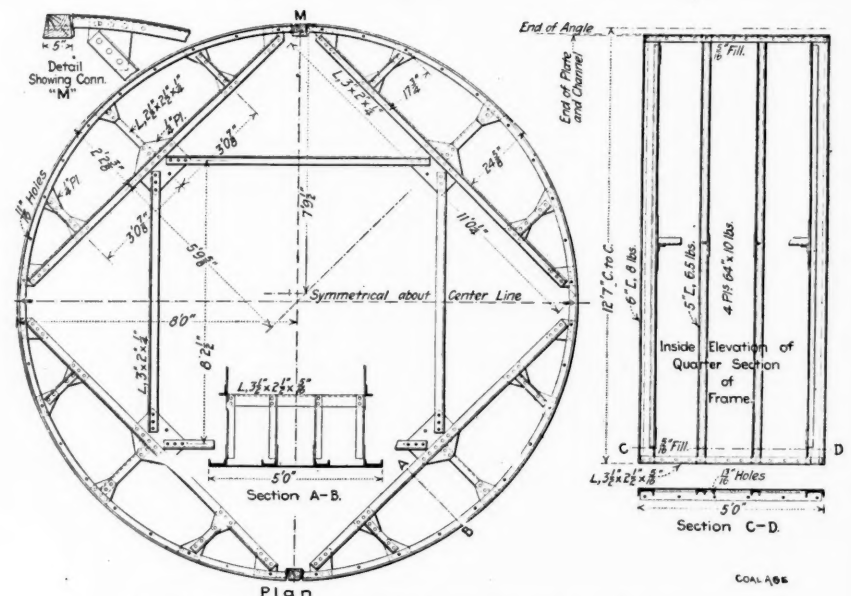


FIG. 4. FIVE-FOOT SECTION OF STEEL FORMS FOR AIR SHAFT

TABLE NO. 2. HOIST SHAFT

Lift	Depth	Excavation		Daily Average, Lin. Ft.		Remarks
		Begun	Finished	Excavation	Concrete	
1	75	Apr. 15	May 10	3.0	4.7	4 days waiting for forms
2	51	June 4	June 27	2.2	5.7	3 days lost
3	73	July 8	Aug. 4	2.9	6.0	2 days lost
4	62	Aug. 18	Sept. 9	3.0	7.75	
5	21	Sept. 18	Sept. 26	2.6	7.0	

Total time, 6 months, average 2 ft. per day.

TABLE NO. 3. COMPARISON OF NEAT AND ACTUAL QUANTITIES

	Air Shaft, Cu. Yd.		Hoist Shaft, Cu. Yd.	
	Excavation	Concrete	Excavation	Concrete
Neat.....	9.6	2.16	13.3	2.93
Actual.....	10.7	3.24	15.6	5.28
Excess.....	11½%	50%	17.3%	80%

Some Mining Accidents

By E. L. COLE

The question of mine accidents, both fatal and nonfatal, has been the subject of much discussion among the students of industrial conditions. The average person, thanks to the educational (?) work of the daily press, has been led to believe that the work of mining coal is

ACCIDENTS FROM SHOOTING

While I was once waiting for a train at Shamokin, Penn., a miner was brought in on a stretcher. His eyes were gone and his entire body badly burned. His fellow miner stated to me that he had been injured while making a cartridge, with his naked lamp on his head, when a spark fell into the powder, causing the cartridge and the contents of the keg to explode. This "accident" happened, despite the fact that all miners are instructed to set their lamps some distance away from the powder keg on the side that the air is traveling, so that any sparks that may fall will be carried away from, not toward the powder.

Not long ago I saw a tunnel driver lay near the point of death in the Miners' Hospital, at Fountain Springs. He was a fairly intelligent fellow, but was always noted for his reckless method of working. One day, when acting as a shotfirer, he cut the fuse short, as was his custom, and as he turned to run after lighting five shots, he unfortunately stumbled and fell a short distance away from the face. As he arose the first shot exploded, hurling a fair-sized rock in his direction, which struck him on the head with such a force that he fell again; the other four shots followed in rapid succession and he was buried beneath a mass of rock, from which he was rescued more dead than alive.

While in the railroad station at Lansford, Penn., some time ago, three miners were brought in frightfully injured and it was feared that their sight was gone. Three others were being sent to the local hospital, while these were being taken to New York in the hope that their sight might be saved. One of these had been tamping a hole and, becoming impatient because some of the powder fell out, he aggressively rammed the remaining portion to the top of the hole; the resultant pressure was sufficient to explode the cap. He and four others were in the very face of the tunnel, and thus five more injured miners were added to the list, not because their employers were negligent, but because the shotfirer disregarded the ordinary precautionary measures.

Only a short time ago, a miner was severely injured at Locust Dale. Two men, father and son, were working together, and, after lighting a shot, they retired to a place of safety; hearing the report of a blast, the father entered the breast, just in time to receive the full force of the shot that he thought had already exploded. Again, another sightless miner was added to the hundreds that populate the hard-coal fields, simply because he failed to heed the warning of a neighbor miner, who had fired a shot a few moments previously, the report of which he mistook for his own.

There is another factor that adds to

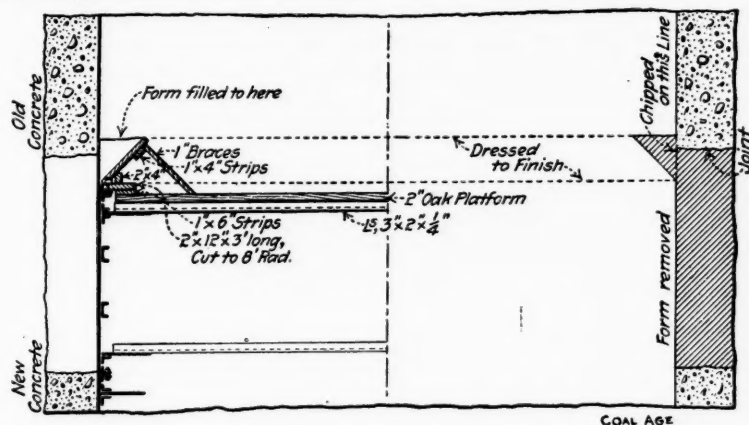


FIG. 5. DETAIL, SHOWING METHOD OF JOINING OLD AND NEW SECTIONS OF CONCRETE LINING

apart, and as the work was carried on under the same conditions in each case, the figures of Table No. 3 illustrate strikingly one of the advantages of the circular shaft, which is not often mentioned, namely, the closer agreement of actual quantities with those called for by the design. It is natural that the circular walls of the air shaft, by reason of a sort of arch action, should have stood up better than the long straight sides of the hoisting shaft, and this was, indeed, shown conclusively by experience.

As the circle is the figure of least periphery for a given area, this form consequently requires less lining, is stronger against external pressure, and can, therefore, be given a minimum thickness. Finally, it offers the least resistance to the flow of a ventilating current (on account of less frictional surface and the absence of corners), and is, therefore, an ideal section for an air shaft. For large capacity hoist shafts, of course, the waste space around the cage ways and the dangers incident to these spaces, constitute the most serious objections to this form of construction.

of a really hazardous nature. While I do not propose to discuss the perils that the anthracite miner daily faces, I have, nevertheless, spent considerable time in the coal mines myself, and am well aware of the fact that the miner is continually beset with many dangers. But, after a careful research and a study of several years into the cause of the loss of life and limbs in the coal industry, I have reached the conclusion that 60 per cent. of the mine accidents lay at the door of the miner himself.

During my sojourn of several years in the coal fields, I viewed one after another of the mangled bodies of the miners of coal, and, cultivating the habit of asking questions, I was amazed at the evidence of the mine workers themselves that I have reached the conclusion that the large loss of life and limbs could be very materially reduced if the miners would only exercise ordinary care, and cooperate with their employers in eliminating the causes of these accidents.

the sum total of mine accidents. This is the ever-prevailing indifference of the average mine worker as to the fate of his fellow workman, due, to some extent, to racial prejudices that are today an active factor in the coal mines. Shots are sometimes fired without adequate warning being given to the nearby workers, and last summer two miners were injured by a fall of coal that occurred in the breast simultaneously with the firing of a shot in the nearby workings. The jar of the blast brought the coal down on them.

GOOD JUDGMENT IN AN EMERGENCY

Probably not many miners have the spirit of a certain motorman in the Panther Creek Valley. This man, when in at the face of the gangway, received word that a large body of water had broken through and threatened to engulf a number of miners. He could have easily escaped himself, by running at top speed to the bottom of the shaft, but with a coolness that was a credit to him, he coupled a long trip of loaded cars to his locomotive and every miner was ordered to climb on the top of the mo-

tor; just as he started the rumbling of the oncoming water was faintly heard. Applying all the power, he sped over crossings and switches at such a pace that the miners were paralyzed with fear. Arriving at the top of a hill, he cut the trip loose and tore through a derailing switch, while the terrific speed at which the loaded cars were traveling when they reached the switch caused them to wreck. They formed a fairly good dam, just as the motorman had anticipated, which held the water in check until all the miners were safely hoisted to the surface.

This motorman thought nothing of his remarkable achievement; little does he realize that were all mine workers to show the same spirit in times of personal danger, how fruitful their efforts would prove in reducing the toll of human life in the production of coal.

A CASE OF POOR JUDGMENT

Contrast his conduct with that of the mine employee, who, when he saw a small fire start near his post of duty, neglected to notify anyone, or put it out. If he had exercised, even to a small degree, the spirit of the motorman, he

would have been instrumental in preventing a mine catastrophe that snuffed out the lives of over a hundred of his fellow employees, and prevented a large economic loss to his employer.

The managers of the anthracite mines have taken excellent measures to furnish aid to the injured, through the first-aid organizations, the work of which has been ably told by others in this journal. But though no expense is spared to guard the mine worker, there still remain before them a gigantic task, the work of educating all miners to the real cause of the fatalities of their vocations.

It may be well to suggest that a start in the proper direction could be made at once by making an impartial investigation of the very next accident at your colliery. Then a brief report of the same could be posted in various languages at the mines. The miners should be given to understand that if they will cooperate with their employers they will not only decrease the dangers about the mine, but will also have the satisfaction of knowing that by their efforts they are assisting in preventing the present large economic loss that burdens society today.

The Electric Lamp in the Mine

Special Correspondence

The question of a safe, suitable light for the miner to aid him in his underground work has always been a grave, though much neglected problem. The safety lamp, while it may remove, to a large extent, the danger of underground mining, has its drawbacks. In the first place, it must be carried about from place to place in the hand, and, hence, it is more or less in the way. The naked lamp removes these objections, but, with its use, there is the ever-present danger of running into an unexpected zone of gas and probably never coming out alive.

The lamp which would satisfy the desires of the miner must be compact enough to wear on the cap, as well as free from the dangerous characteristics of the naked lamp. A lamp which will give light without admission of the exterior air will, therefore, not only be safe, but, if it can be made compact, will answer all the requirements of an ideal safety lamp. Hence, the electric mine lamp.

THE HIRSCH STORAGE BATTERY

For a long time great difficulty was experienced in finding a storage battery which would meet the rigid requirements of mine use. An electrolyte was wanted which would not spill over and ruin a man's clothes.

After many years of exacting research H. H. Hirsch, of Philadelphia, succeeded in perfecting such a battery, and there

The article shows the advantages of the electric light over naked or safety lamps in mine work. It deals with the problems encountered in trying to invent a suitable storage battery for mine use. Finally the relative costs of the naked and electric lights are compared.

are now in use in the anthracite field alone nearly 4000 portable lamps of the Hirsch type.

The construction of the battery is unique in that the two electrodes are arranged horizontally and the plates are separated by a composition of wood fiber and rubber. Next, it was necessary to find a solid electrolyte which would not spill over. After a number of experiments, a material was found which, when treated with certain acids, formed a gelatinous silicic acid and set to a congealed jelly in half an hour after charging. Surprising as it may seem, this curious electrolyte does not add to the internal resistance of the cell. The new type of battery measures 2x3x4 in. and is carried on a 1¼-in. leather belt, either slung over the shoulder or worn about the waist, without the least danger of spilling. In fact, the batteries may be

turned upside down or right side up, at will.

THE LAMP

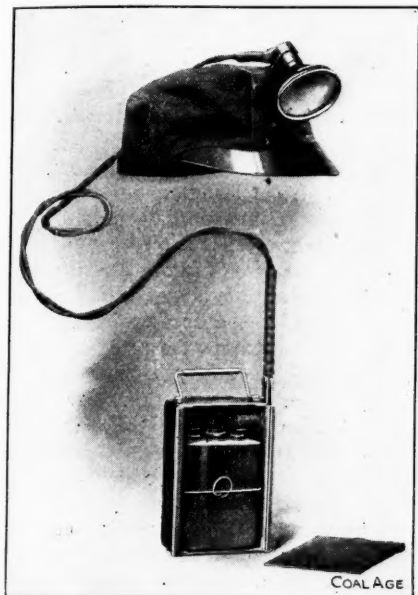
A No. 16 brewery lamp cord, with copper terminals, carries the current to a 2-cp. special Mazda lamp, fastened to the miner's cap. Thus, the miner is not encumbered in his work, for he can put himself quickly in any position without restraint. He can use a pick, drill, or shovel, with as much freedom as when wearing an ordinary miner's lamp. Furthermore, the nuisance of the smoke and dropping oil is obviated, and the dangers of a naked lamp are eliminated; for, if the outer glass breaks, the current is automatically cut off before the bulb is fractured.

The lamp outfit will give 12 hours' continuous light on one charge. In fact, on several occasions, batteries have furnished current for as long as 30 hours. Another interesting and useful feature is the fact that the lamp can be detached from the cap and attached to the battery case, forming a hand lantern in case the cord should tear or break.

ADVANTAGES

On the whole, it is a neat and useful outfit, the use of which is not confined alone to the mine light, for shot firers may use the same battery in firing a shot.

The batteries are quickly detached, recharged over night, and ready for use



THE HIRSCH LAMP OUTFIT



INSPECTING THE BATTERY



LAMP AS HAND LANTERN

the next day. Direct current from the ordinary mine-haulage circuit is used for the recharging, the necessary accessories being an ammeter to indicate the proper charging current, a voltmeter to indicate the condition of the charge, and a rheostat or bank of lamps to control the charge. The usual rate, 2 amperes for 8 hours, followed by 1 ampere for 1 hour, permits of charging 100 batteries in series from a 250-volt circuit.

The electric lamp is highly appreciated in dry portions of the mine, where there

is danger of fire, such as stables and other underground buildings.

In closing it may be well to say a few words about the relative cost of oil and electric lamps. From an economic standpoint alone the electric lamp is bound to demand an increased usage. A naked-light will cost a miner from 30 to 40 cents per week for oil. This same weekly amount will cover not only the cost of the maintenance of the electric lamp, but also the interest on the investment.

Furthermore, the electric lamp should commend itself for its compactness and cleanliness. There is no dirty smoke, no dripping oil, and, best of all, no danger in a gaseous zone.

Tate found many years ago that it was not strictly correct to say that a Davy lamp would pass a flame at a velocity of 6 ft. per sec., as the lamp exploded at as low as 3 ft. per sec., when kept in the test for a sufficient length of time.

The velocities at which lamps will explode or pass flame into gas are: Davy, 6 ft. per sec.; Stephenson, 13 ft. per sec.; Clanny, 8 ft. per sec.; naked Mueseler, 21 ft. per sec.; bonneted Mueseler, 40 ft. per sec.; Marsaut, 40 ft. per sec.; Davy, in a can, 40 ft. per second.



THE MINER IS NOT ENCUMBERED IN HIS WORK



ATTACHING LAMP TO BATTERY

Proposed Ventilation System

By Thomas Davies*

In all mine explosions, by far the greater majority of fatalities are due to the effect of the deadly afterdamp of the explosion, and the inability of the men who have not been injured by the force of the blast, to escape from the mine without passing through entries filled with the deadly gases. The force of the explosion, in most cases, has destroyed doors, stoppings and overcasts, and deranged the entire ventilating system. It is the existence of these conditions that has led me to suggest the following four-entry plan of ventilation, which I think will be found to have some special features worthy of consideration.

Briefly stated, the object of this proposed plan is to minimize the spread of the explosion and enable the quick recovery of the mine and the rescue of any of the men who may have been uninjured by the force of the blast but would inevitably be caught and overcome by the deadly afterdamp.

The accompanying diagram shows but one side of the mine, including the two sections, A and B, lying to the left and right, respectively, of the main headings. The other side of the mine is a duplicate of that shown in the diagram. As is here shown, the main headings consist of two pairs of headings or entries separated by a solid barrier of coal 100 ft. wide. This barrier is crosscut by narrow headings, which are preferably located opposite the mouth of each alternate pair of crossheadings, or say about 500 ft. apart. These crossheadings are driven as narrow as it is possible to drive them, and a heavy wall of concrete is built in the center of each, with an 18-in. round hole left for a manhole. The manhole is covered with a heavy iron door or closed by a plug that may be removed easily when desired. The thickness of the concrete wall will be governed by the sectional area of the airway.

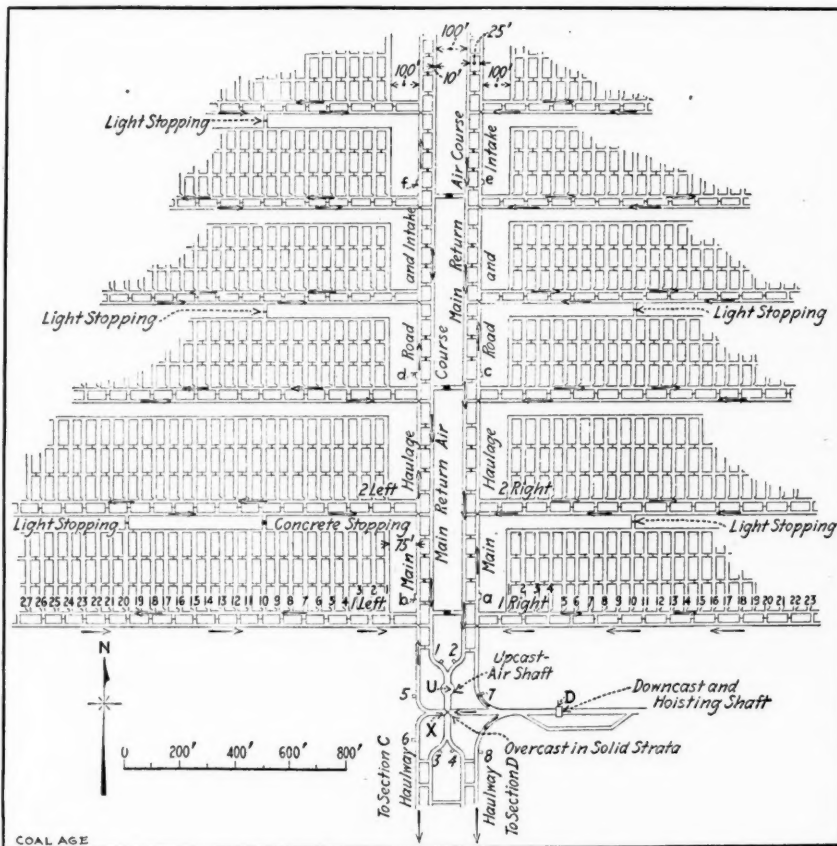
The crossheadings are driven on the double-entry system, to the right and left of the main headings and rooms are turned on one side only, of each pair of crossheadings. A solid pillar of coal 100 ft. wide is left on each side of the main headings to separate them from the rooms driven off the crossheadings. The rooms off the crossheadings are driven up within 50 ft. of the air course above, thus leaving a chain pillar 50 ft. wide to protect the next pair of crossheadings. As shown in the sketch, each alternate chain pillar is cut through at regular intervals, say opposite each tenth room, by a narrow crossheading, which is closed at first by a light stopping and later by a heavy stopping calculated to assist the force of an explosion. The last crosscut in a chain pillar is made light or col-

A four-entry system embracing a 100-ft. barrier pillar of coal, which serves to divide the mine into four separate districts, any one of which can be quickly converted into a rescue chamber of large size. Other features are proposed to enable the rapid restoration of the ventilation when the doors, stoppings, etc., have been destroyed by an explosion of gas or dust in any section; and to provide for the escape of those who may have survived the blast. The author invites criticism and discussion of his proposed plan.

*Mine Foreman, Davis Colliery Co., Bower, W. Va.

In case of an explosion, the destruction of these collapsible air stoppings will probably prevent the destruction of the overcast. In like manner, the stoppings in all crosscuts, in the chain pillars, are first built light or collapsible.

Another feature of the plan is the erection of emergency doors, marked a, b, c, d, e and f, in the accompanying diagram, set back in the rib of the main headings, just inby of each crosscut in the barrier pillar separating the main headings. The closing of these emergency doors, when possible, after an explosion that has destroyed the air stoppings on any pair of crossentries, makes it possible to ventilate the crossheadings in pairs, by sending the air up one pair of crossheadings and through the crosscut in the chain pillar, returning by the other pair of crossheadings to the main headings.



PLAN SHOWING PROPOSED ARRANGEMENT TO MINIMIZE EFFECT OF EXPLOSION

lapsible and reinforced later when the next crosscut has been driven.

The plan shows an overcast at the mouth of each pair of crossheadings, by which a separate ventilating current or air split is provided for each. All the stoppings are well built; but for the protection of each overcast, the stoppings in the main headings, on each side of the air bridge, are built light or collapsible.

Similar emergency doors are provided on the shaft bottom, at the points marked 1, 2, 3, 4, 5, 6, 7 and 8. These doors are used, in case of an explosion, to concentrate the entire ventilating current in that section of the mine where the explosion has occurred.

This mine is ventilated by an exhaust fan at the top of the air shaft marked U. The hoisting shaft is the downcast marked D.

D. Haulage is performed on the intake airways. The principal air crossing marked X is driven in the natural strata, to avoid its destruction in case of an explosion.

It is not claimed that this plan, as here outlined, is perfect in detail. It is offered here for such criticism and suggestions as the readers of COAL AGE may see fit. The special features of the plan are that the mine is divided into four distinct and separate sections, separated by practically indestructible barriers pierced by escapeways or manholes, by reason of which any one section of the mine may be converted into a rescue chamber. Further, by crosscutting every alternate chain pillar, as described, it will generally be possible, with the assistance of the emergency doors on the main headings, to quickly restore the ventilation in any pair of crossheadings in which an explosion may have destroyed all of the stoppings.

The provision made at the shaft bottom for crossing the main air currents, by means of a natural air bridge driven in the strata, will insure the permanency of the main ventilating current at this point. The collapsible stoppings, on the main headings, on each side of the overcasts, will, in a large measure, it is hoped, protect these air crossings from destruction by the force of the blast. In addition to these collapsible stoppings, each overcast should be provided with a relief or explosion door. The ventilation of the mine on the exhaust system, by which the main haulage roads are made the intake airways, will naturally add much to the security of the mine. The air shaft should, of course, be provided with explosion doors. The fan should be set back a sufficient distance from the top of the upcast shaft to avoid its being put out of commission by an explosion. This system, it is believed, will avoid any necessity for reversing the ventilating current, in the mine, although this point is debatable. I hope the matter will be freely discussed by readers and that suggestions will be given as to methods by which the plan may be improved; or perhaps some other plan devised having the same purpose in view. I may say in closing that I have submitted this scheme to many experienced mining men who indorse it as practical.

Turkey as a Coal Producer

The following information on the production of coal in Turkey comes from consular sources: "Heraclea coal is gaining in reputation, and the annual output now amounts to about 800,000 tons. It is shipped to Roumania, Constantinople, Smyrna, and Piræus, but most of it is sold for bunkering vessels calling at Zongouldak. Other coal fields, ranging from ordinary lignite to anthracite, are known to exist in Turkey."

A New Mining Machine

No industry is more prolific of disaster both distressful and costly than coal mining, and no other industry of this country, owing to the crude methods employed, imposes such hardships upon the workman immediately engaged in taking coal from the seam.

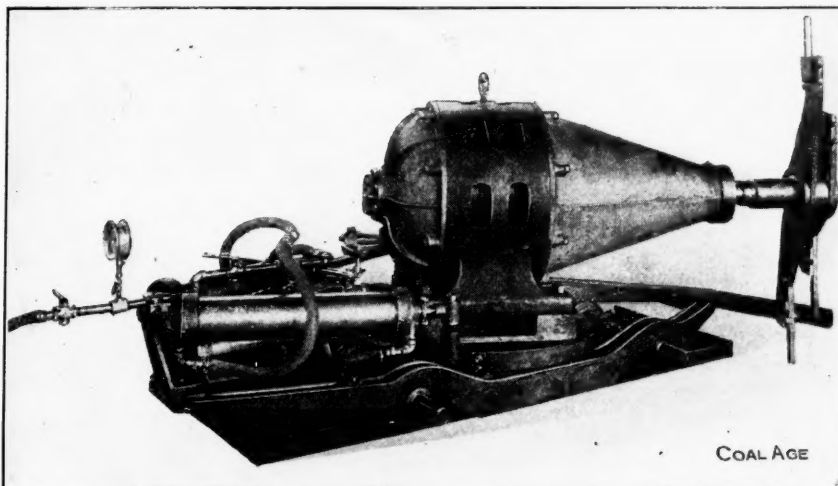
To alleviate these distressful conditions and to render the mining of coal a more economical business than it is at present, J. H. Hoadley and W. H. Knight have developed a system of mining by machinery, which, after several years of experimenting, has now reached a state where it is considered practicable.

Primarily designed to cut the whole seam of coal into a granular state suitable for coking, this coal-milling machine has proved itself so economical in operation that it threatens to effect a radical change in the present methods of mining.

It should also be remembered that powdered coal, when blown into a furnace with an air blast, gives greater efficiency

circular saw cuts wood. The motor is given, in addition to its forward movement, a sidewise swinging motion through a limited angle, so that the proper width may be cut. The height of the cut is determined by the diameter of the cutting tools, which would, of course, be different for different heights of seams.

Any partings are, of course, comminuted at the same time as the coal and are separated afterward in the washing process. A fire-engine hose leading from some source of water under pressure enables a powerful stream of water to be thrown against the face of the coal while it is being cut, thus eliminating all dust and keeping the tools cold. The water thus projected against the coal carries away with it the comminuted product, which runs off to the nearest sump, from whence it is pumped to any desirable destination. The machine, owing to its power of advancing directly into the coal, will cut a slope, an entry, a room, or work a longwall. In driving entries, or working rooms, advantage is taken of any



VIEW OF THE HOADLEY-KNIGHT MINING MACHINE

than does lump when burned on the grate.

There are, however, 100 million tons of coal coked each year in this country, and it is with especial reference to this kind of coal that the inventors have directed their attention.

The Hoadley-Knight coal-milling machine not only cuts the coal from floor to roof into a finely powdered state, but pumps it, mixed with the water of the mine, to any distance desired, as, for instance, to the coal washer or the coal bins adjacent to the coke ovens. It necessarily does away with the use of explosives, and as the mine is always wet and washed clean, there would never be any coal dust. The system is a peculiarly safe one to use in gaseous mines on this account.

The machine itself is automatic, advancing by a simple hydraulic feed mechanism which propels it along the floor into the face of the seam, the rotary cutters on the armature shaft of the induction motor cutting the coal very much as a

grade, so as to facilitate the drainage to the sump.

It is found that the violent jet of water so aids the breaking up of the coal by the cutter that the coal breaks clean to the floor and the roof, even though the cutters do not reach within several inches of either. It is found also that by cutting narrow rooms and leaving narrow pillars, timbering is largely done away with, and in some mines is rendered entirely unnecessary. The elimination of timbering, haulage and explosives and practically all of the hard labor are some of the things that are claimed for this system.

The machines at present being manufactured have a capacity for cutting 100 to 250 tons per day. These will be followed by much larger machines, which will raise the possible tonnage per machine to 500. The machine will drive an entry 200 ft. in one day. The mixed coal and water is handled by electrically

driven centrifugal pumps with one or more stages, according to the lift required. In dry mines the water, after being separated from the coal at the washer, is returned to the mine.

It has been predicted for a number of years that American ingenuity would develop this art as it has so many others, and that in spite of its discouraging environment, something very much better in every way than the present imperfect and make-shift systems would emerge and take its right place as an economic factor in the commercial world.

[The manufacturers assure us that this machine has been proved out at the Lewisburg mine, in Alabama. In operating upon an entry in that mine, the cutter advanced at the rate of 6 ft. per hour, the cut being 9½ ft. wide and 4½ ft. high; this amounted to somewhat over 10 tons per hour. The tool wear was almost negligible. This showing was on a 20-hp. machine, while the one in the accompanying illustration is 60 hp., and it is claimed will produce treble the output of the cutter employed in the Lewisburg mine.—EDITOR.]

Egyptian Market

The following extract shows that consuls continue sanguine: "An American firm recently undertook to supply 100,000 tons of American coal to the Egyptian State railways, and keen interest is taken in Constantinople in the possibilities of American coal for the Levant generally. Important results are expected from pending negotiations. With the practical certainty of a direct steamship line between New York and the Levant being started during 1912, it is safe to assume that both soft and hard American coal will be sent here in increasing quantities."

The Mine Inspector

The following extract is taken from an open letter by James Taylor, state inspector of mines, Fourth district, Peoria, Ill., published in the *Ohio State Journal* of June 21, 1912, Columbus, Ohio, commenting on the deplorable political situation that has made it necessary for temporarily holding up the reappointment of chief mine inspector, George Harrison, this year, in Ohio. The letter states:

"The Mine Inspector's Institute stands for the highest efficiency that can be obtained in the important office of mine inspector. It advocates those things that operate to produce such efficiency, and chief among these are a protracted tenure of office and the removal of an inspector for cause only. It was this feature to which my remarks were directed in addressing the institute at a recent session.

"I deplored the conditions and environment of the office of mine inspector, in every state, as illustrated in Ohio today,

that would make it necessary to place another man than Geo. Harrison in charge of the state department of mines, which he has, by his knowledge and industry, developed and brought to its present state of efficiency. Governor Harmon, as we all know, has and is still exerting his utmost power to avert what would only prove a disaster to the mining interest of the state he serves."

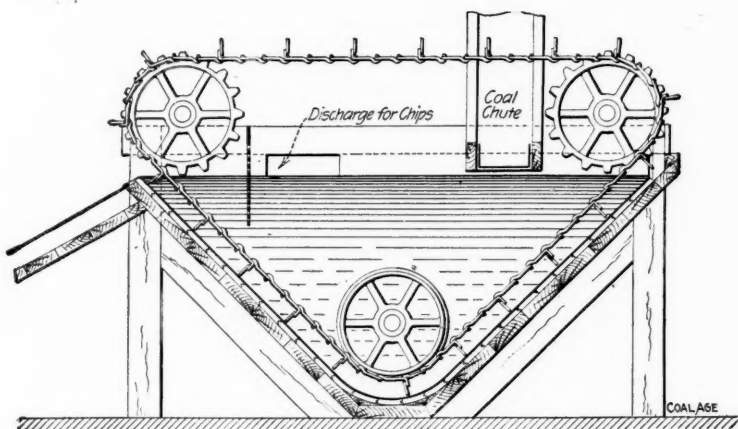
Device for Removing Chips

As long as timber is used so extensively within the anthracite mines, it may be predicted that a certain proportion of it will continue to come to the surface along with the coal. Mine props, lagging and even track ties are a source of no little annoyance when they make their appearance in the dump chute of the breaker, but their removal taxes the patience rather than the ingenuity of the colliery employees. It is the small fragments and chips of wood, which defy removal in the jigs and picking chutes, that occasion the most serious trouble in this connection; and not infrequently it happens that such a large number of these

water which accompanies it. The flights are notched and perforated to prevent their discharging any considerable amount of water. Naturally, the chips which are brought in with the coal float on the surface. Water is being constantly fed into the tank and runs off at a rectangular opening in the side, causing a current in that direction, which carries the chips with it.

A partition of perforated screen plate is inserted just behind the forward sprockets of the conveyor line and carried down well below the surface of the water. This prevents the pieces of wood from floating over and mingling with the coal at the point where it is discharged.

In view of the fact that at some breakers a considerable number of men and boys are kept busy, chiefly in picking out fragments of wood from the prepared coal, it is easily understood that the apparatus referred to, has proven a desirable and economical installation. A separate outfit is of course required for each size of coal but a total of three or four usually suffices, as the smaller sizes are not equally affected by impurities of this nature. The construction it-



APPARATUS FOR REMOVING CHIPS FROM PREPARED COAL

chips find their way into the prepared-coal storage pockets and thence into the transportation cars that the quality of the product is considerably impaired.

At the Burnside colliery of the Philadelphia & Reading Coal & Iron Co., just outside of Shamokin, Penn., the breaker foreman has devised a scheme for removing these small fragments of wood, which is very successful and satisfactory in its operation. This device is shown in the accompanying sketch, Fig. 1.

Briefly the apparatus consists of a V-shaped tank filled with water, and a double-strand scraper line. Coal is led into the tank by a chute which terminates at the water level. It, of course, settles to the bottom of the tank and is carried up by the flights of the scraper line, being discharged over a perforated screen plate to remove the small quantity of

self is simple and inexpensive, the power required is small, and the necessary water can, of course, be used over and over a number of times.

British Statistics

English coal mines gave employment to 1,049,407 men during the year 1910. Of this number 848,381 or 80.8 per cent. were employed underground. Of the 201,026 surface workers 6221 or 3.09 per cent. were females. There was an increase of 258 females during the year as compared with 1909. The number of employees under 16 years of age working underground was 53,612 or 6.3 per cent. of all underground workers. The total number of underground and surface workers under 16 years of age was 72,094 or 6.87 per cent of all mine workers.

Current Coal Literature

The Best Thought Culled from Contemporary Technical Journals, Domestic and Foreign

Appraisalment of Michigan Coal Lands

By H. M. CHANCE*

We may summarize the conditions which at present are necessary in Michigan to constitute a workable tract of coal land, as follows:

1. The coal bed must have an average thickness of not less than 3 ft.
2. Marginal areas showing a thickness of less than 2 ft. 6 in. must be excluded.
3. These thicknesses must be of coal, and not of coal and slate partings combined.
4. The quality must be fairly comparable to that produced by other mines of the district.
5. The coal must have a fairly good roof and sufficient rock cover.
6. Other mining conditions must be fairly comparable to those of other mines in the district, so that coal can be mined at a cost not greatly exceeding the cost per ton of other mines in the same neighborhood.

YIELD PER ACRE

Owing to poor roof, irregular thickness, risks involved in robbing out pillars, and the irregular shapes or conformation of the workable areas, the yield per acre, per foot in thickness, is relatively small. From 1200 to 1350 tons per acre for each foot in thickness are average yields obtained in other mining districts, but in this coal field a yield of about 1000 tons per acre for each foot in thickness will probably represent average results, and this figure has been adopted and used in making all these computations of tonnage.

VALUE OF UNKNOWN TERRITORY.

As the coal beds lie deeply buried beneath the surface, thorough prospecting with a drill is necessary to prove the existence of workable coal in any locality and to define the size and shape of the workable area. We cannot learn that lands within the limits of this coal field, which have not been explored for coal by drilling, are considered more valuable by reason of the possibility that workable coal may underlie the surface; nor can we learn that the mineral rights or rights to mine coal from such lands is marketable at any price.

The possible existence of workable coal in undrilled territory is regarded as so vague and uncertain that investors have not been in the past, and are not now willing to purchase the mining or mineral right to such lands. In view of these facts and conditions, it seems reasonable to conclude that neither the coal mining rights nor the coal existing in unproven territory in the Michigan coal field has at present any definable money value; that is, they have no present value.

VALUE OF PROVEN TERRITORY

The finding in a single drill hole of a bed of coal of workable thickness does not prove the existence of a workable area, but merely indicates that it may exist, and to prove this, a sufficient number of holes must be drilled to show that such thickness exists over an area large enough to justify the expenditure necessary for its development.

FACTORS AFFECTING VALUES

The quality of the coal has an important bearing upon its value, and the quality and prices of those coals from other districts with which it is in competition are equally important factors in determining the correct appraisal. The thickness and mining conditions of any coal bed and the cost of mining labor in the district fix the cost of mining. Profitable operation is possible only when the coal is sold at a fair margin above the cost of production, and this selling price in turn depends upon the quality of the coal as compared with the quality of that from other competitive districts and upon the prices at which such competitive fuel is sold.

Without attempting to go into a discussion of minor details, it will be sufficient to summarize these conditions as follows:—The thickness of coal now being worked in the Michigan mines is less than that of competitive coals of the Ohio and West Virginia coal fields, and the mining conditions are also less favorable. The principal adverse physical conditions are:

1. All coal must be mined through shafts.
2. Quantity of water to be pumped is relatively large.
3. The thickness of the coal is irregular.
4. The coal beds are thinner.
5. Workable areas are more narrowly restricted.

6. Roof is troublesome, requiring expensive timbering.

7. Coal demand is irregular during the summer months.

LABOR COST AND MINING SCALE

The mining and wage scales in Michigan are higher than in the competitive Ohio and West Virginia districts, and the extra allowances received by the Michigan miners for narrow work, rock, etc., are usually computed by more liberal methods than is customary in other coal fields. These conditions naturally tend to increase the cost per ton.

The cost of dead-work under ruling scales in this state and for a 3-ft. bed of coal should not normally exceed 25 or 28c per ton, but in practice it is seldom less than 30c., and often reaches 40c. or more. The cost of materials and supplies is generally excessive, and instead of a charge of 8 to 15c. for these items, this cost usually ranges around 30c. per ton. Miscellaneous labor, inside and outside, shows costs of about 25 to 30c., and this is increased by the smaller output during summer.

As the price of mining, which is on the run-of-mine basis, is equivalent to \$1.01 per ton for screened coal, and as overhead charges further advance the price from 10 to 15c., it is easily explained why the cost of coal is \$1.70 per ton.

QUALITY OF MICHIGAN COAL AND COMPETITIVE FUELS

In quality the Michigan coal is distinctly inferior to the Ohio and to the West Virginia coals, which are shipped into that state. These foreign coals usually contain less moisture, less sulphur and less ash, and are, therefore, of correspondingly higher value, and this difference is soon discovered when the price is based upon the thermal value as measured by the number of British thermal units generated in actual combustion tests. It must not, however, be understood that the Michigan coals are not fairly good steam fuels, or that they are not satisfactory fuels for domestic use. The difference in quality represents a difference in value averaging from 20 to 40c. per ton; that is, some of the Michigan coals are worth from 20 to 40c. less per ton than average Ohio and West Virginia coals.

*Drexel Building, Philadelphia, Penn.
Note—The conclusion of an article which appeared in Coal Age last week.

COST OF MINING

The disadvantages under which these Michigan coal mines are operated increase the cost of mining, as compared with the average cost in Ohio, by about 60 to 80c. per ton, and by about 75 to 90c. per ton as compared with the average cost in West Virginia. A large part of this increased expense is due to the losses in maintaining the mines throughout the summer, when nearly all of them are worked at a loss, or are maintained in working condition at a cost which must be charged up to mining when operations are resumed in the autumn.

ADVANTAGES OF THE MICHIGAN COAL

The operator in the Michigan coal field has for a natural market all that portion of the lower peninsula of Michigan lying north of Lansing and Grand Rapids, and especially that section immediately surrounding Saginaw and Bay City, and lying north, west and northwest of those two cities.

In the above described region the Michigan coal has a natural protection, which the freight rates on the Ohio and West Virginia coals assure by creating a differential of from \$1.40 to \$1.60 and more per ton from the Ohio districts and one of about 25c. per ton still higher on coal from the West Virginia districts. Hence it is apparent that the Michigan coal mines should control the market and furnish the greater portion of both steam and domestic fuels consumed in this district, and that this business should be conducted at a fair margin of profit.

REASONS FOR UNSUCCESSFUL OPERATIONS

This conclusion may appear to be at variance with the facts, for the past history of this coal field presents many instances of unsuccessful operation. In all these cases I believe, however, that the cause of failure can be traced to inadequate drilling to determine the thickness, quality and extent of workable coal, to inexperience in the business, to increasing the output until the production was in excess of the local market demand, to attempting to market coal beyond the natural limits of the district or to destructive competition with other mines of the same field. I believe that by confining the sales of this coal to the markets in which natural conditions tend to restrict it, the operators ultimately should succeed in placing the industry upon a stable and satisfactory business basis.

For these reasons I believe that the same principles commonly applied in appraising values elsewhere should be used in determining values in this coal field, and that the method suggested above, as

applied to this district, will fix values which are rational, and which will harmonize with those established in other coal mining districts.

UNIT OF VALUE

In suggesting 10c. per ton as a unit of value I have assumed that the industry can and will be so conducted as to produce a net profit (after deducting from the selling price of the coal, all costs incident to carrying on the business, including depreciation, sinking fund and amortization of investment) sufficient to justify an average minimum value of 10c. per ton.

If the industry were more firmly established upon a profitable basis, this unit of value would naturally be larger, and only a slight improvement in trade conditions would be necessary to justify an increase in this unit to 18 or 20c. The principal additions to or deductions from this basic unit of value have already been discussed, but in some cases other allowances or adjustments may be required to represent variations in value caused by varying thicknesses of the coal and by marked differences in quality or in mining conditions.

LEASEHOLDS AND ROYALTIES

Most of the coal territory controlled by present operators is held under leases, the terms of which give to the lessee the exclusive right to mine and remove all the coal. The royalties paid under these leases have commonly ranged from 5 to 10c. per ton, but in exceptional cases, and especially at small mines, higher royalties have been paid. Many of the leases originally made at or about 10c. per ton have from time to time been readjusted to a lower basis, and the average royalty now paid is probably little more than 5c. per ton, and we understand some leases have been made at even a lower figure.

Most of the leases require a certain minimum payment per year, and in the case of certain undeveloped properties this payment is usually based upon the number of acres leased, a common price being from \$1 to \$2 per acre per annum, but this annual payment is in many cases also readjusted to a lower basis. By the terms of these leases the money so paid is usually defined as an advance payment of royalty upon coal to be mined after mining operations are commenced.

Within the past six or eight years, large areas have at times been leased and held by operators and by others for speculative purposes, but most of the leases so held have been allowed to lapse by non-payment of the annual "advance royalty," and with few exceptions

the present policy of individuals and corporations engaged in mining and in prospecting coal land is to retain control only of territory which by drilling has been proven to contain coal of workable thickness and quality.

STABILITY OF VALUES

With increasing population, and still more rapidly increasing demand for fuel, both coal land and coal mining rights are steadily growing in value in almost every coal field in the United States, and it is reasonable to anticipate a like increase in value in the Michigan coal field. The consumption of coal in the United States has about doubled every ten years for the last sixty years, and coal land values have generally kept pace with this rate of increase.

In some localities coal land has increased in value four-fold and six-fold in the past ten years, but these are extreme examples of abnormally rapid increase in market value. I believe that the proven areas of workable coal in this coal field will surely increase in value proportionately with the increase in population and in the consumption of coal.

Conditions which would tend to decrease the value of these lands would be the discovery in Michigan of larger areas of better and thicker coal, or radical reductions in freight rates, such as would enable the operators of competing districts to deliver coal at a price less than the cost of mining in the district.

VALUE OF PLANT AND EQUIPMENT

While the value of the plant and improvements at any colliery after the coal is exhausted, if restricted to the value of the machinery and of the equipment at second-hand or at junk prices, is relatively small and unimportant, yet to reach an appraisal which shall represent such value as a purchaser might be justified in paying for a property, it becomes necessary to add to the coal land appraisal as determined by this unit system, a sum to represent what may be termed a salvage value of the plant.

This salvage value is greater to operators who may be able to use the machinery at other mines than to those who having no use for it must dispose of it at the best price which can be obtained in the open market, but such method of reasoning is not justified, because an operator desiring or willing to use second-hand machinery can usually buy it at current second-hand prices, and it, therefore, seems proper that the salvage value at which the mining plant, that is the movable machinery and equipment, is appraised should be based upon cur-

rent second-hand prices for machinery of this type.

This salvage value at collieries that are fairly well equipped will range from \$3000 to \$4000, up to perhaps \$20,000 or \$25,000, depending upon the class and type of machinery and equipment, and upon its length of service and state of repair.

PROVEN COAL IN MICHIGAN

County	Acres	Tons	Appraised value
Bay.....	4,607	14,945,746	\$484,709
Saginaw.....	3,297	9,556,583	350,924
Midland.....	343	1,029,000	12,862
Tuscola.....	10	35,000	3,500
Shiawassee.....	260	780,000	9,750
Genesee.....	936	2,836,333	..
Ingham.....	0
Eaton.....	0
Clinton.....	0
Jackson.....	0
Total.....	9,453	29,182,662	\$861,745

Average value per acre of appraised land \$101.18.

Stygia—A New Brazilian Explosive

Señor George, after long and laborious experiments and investigations, has commenced to manufacture an explosive called Stygia, which might be advantageously substituted for dynamite or other explosives of foreign origin.

Stygia has been subjected to most rigorous tests in the presence of competent authorities. Among these were: Hermet Leao, representative of the Finance Minister; Cicen Monteiro, of the Ministry of Roads; Oscar Trompowsky and Tobias Monteiro, representing the director of the Industrial Center; Antonio Olyntho, representing the press, and many other persons in trade and industry.

SAFETY IN HANDLING

Stygia, as upon other occasions, gave excellent results in these new trials, its superiority over its foreign competitors being obvious, its safety being absolute and its energy unquestionably greater than that of dynamite.

The first experiment was conducted to prove the safety of this explosive in contact with an ordinary fuse, and Stygia met the test with complete success. It only explodes when acted upon by the proper detonator. Another test was made to prove that the Stygia employed was uniform in its effects.

ENERGY IN ACTION

The second experiment was made to compare the dynamic effect on soft steel

plates of 25 grams of Stygia B, with that of 30 grams of Nobel dynamite, 30 grams of gelatin and 25 grams of explosive gelatin. Its success was still evident, as the Stygia broke the plate, while the other charges hardly indented it.

Similar tests were made with equal quantities of Stygia and Nobel dynamite placed on soft steel plates, and these likewise were favorable to the new explosive. To test its safety qualifications more thoroughly the Stygia was pierced by a Mauser bullet and did not explode, while dynamite, hardly perforated, went off.

Finally a comparison was made between the smoke produced by Stygia and other explosives, and this test also showed the manifest superiority of George's explosive. As in other tests, it was evident that Stygia is not caustic nor liable to produce gases injurious to the health of the operatives who use it.

The Coal Deposits of Servia

Geologically, the coal deposits of Servia may be divided into four groups; coal of the Carboniferous system, Liassic and Cretaceous coal, Tertiary brown coal (ancient), and Tertiary lignite (recent). Coal of Carboniferous origin is found in the Carboniferous basin situated between the Mlava and the Peck, in a series of clay shales, sandstones and conglomerates. From the fossil plants found in the coal shales this coal would correspond to the upper Carboniferous horizons, and may be compared with the Saarbrück and Ottweiler beds in the Saar basin. The exact value of the deposits, however, cannot be estimated at present, in the absence of sufficiently extensive investigations.

Among the numerous deposits of coal existing in the Mesozoic formations, mention will be confined to those actually worked. The chief of these are at the Dobra mines, situated on the Danube, opposite the Drenkova mines in Hungary. The coal-bearing formation, which extends for a distance of 2½ miles, belongs to the Lias, and comprises three seams varying in thickness from about 3 to 30 ft. These seams, however, contain interstratified beds of sandy clay, which necessitate the washing of the coal, and thus cause a loss of 25%. The coal output of the mine is about 25,000 to 30,000 tons per annum. Next in importance is the Vrska-Tchonka mine, which has only one workable seam, seven to ten feet thick. The property covers an area of about 1000 acres, and is worked by the Servian company "Le Timok," the average output being 30,000 to 40,000 tons per annum. Two other mines, the Bolievats and Vina, have not yet reached the producing stage.

The Tertiary coal deposits are scat-

tered all over Servia in the form of small isolated basins in the Cretaceous formation, or grouped at the edges of vast Neocene basins along the rivers Sava, Morava, Danube and Timok, where they are indicated by several outcrops of lignite. It should be observed, states the *Bulletin de la Société de l'Industrie Minière*, that the deposits in these river basins consist almost entirely of recent lignites, whereas in the isolated basins on the more ancient formations (Cénié, Yelachnitsa, Sitchevats) brown coal is found.

The important Cénié mines belong to the State, and are situated at a distance of about 14 miles from the Paris-Constantinople railway, to which they are connected by a narrow-gauge branch line near the town of Tchoupria. The maximum thickness of the measures is about 115 ft., and the minimum 10 ft. Originally founded by the Servian government, the mines were handed over to the railway administration. Although the deposits are thick, they are not continuous, and at the present time the mines, which have produced as much as 120,000 tons per annum, are nearly exhausted. The administration afterwards acquired the deposits at Revna-Réka, covering an area of 200 square miles and containing beds of an average thickness of 19 ft. This property is served by a railway, seven miles long, between Cénié and Ravna-Réka.

The Yelachnitsa mines are situated in the valley of the same name, the brown coal deposits being contained in a series of limestones and 'fresh-water marls. One of the seams, 8¼ ft. thick, is now being worked by a French company; but recent borings have revealed the existence, at a depth of 44 yd., of a thick seam, which presumably extends all over the Yelachnitsa valley and even to the further bank of the Nichava. It is intended to work this deeper seam also. The coal is similar to that at Cénié, and belongs to the Upper Miocene formation.

Other coal-bearing strata have been discovered at Javan-Dal, in the basins of the Drina, Save and Timok, but for various reasons these have not been worked. The chief deposits in the basin of the Morava are of the Sarmatian epoch, and frequently contain beds of lignite, especially in the vicinity of Pojarevats, Tchoupria and Alexinats. Owing to the proximity of the railway, these deposits are worked. The Novi-Kralievats mine, which was established in 1887, was acquired in 1903 by a Belgian company, which laid down an extensive plant at the Alexinate colliery, and obtains good results, in spite of the inferior quality of the coal, which is high in sulphur and has only a low calorific value. Two thin seams of lignite of good quality, are also worked near Zeitchar.

Note—Translated for Coal Age from the Portuguese of the Revista Maritima Brasileira through a Spanish version in the Memorial del Estado Mayor del Ejército de Chile.

Who's Who—in Coal Mining

Devoted to Brief Sketches of Prominent Men, Their Work and Ideas

[The subjects of these sketches recently published have mostly been prominent operators in the anthracite field. In many cases, we have been compelled to travel a considerable distance to personally interview the men who have been selected for attention in this department of our paper. A little later we intend to journey through the South and West for the purpose of selecting subjects and securing data for additional biographies. In order that we may meet the wishes of the great body of Coal Age readers, we earnestly request that each subscriber submit a suggestion to us relative to who is entitled to the sort of recognition we have been giving prominent people engaged in coal mining.—Editor.]

Some men are blessed with luck—fortune often smiles on others once their start is made—but the man who persistently meets adversity with a grin and everlastingly keeps plodding on, is the one who usually commands respect above all others.

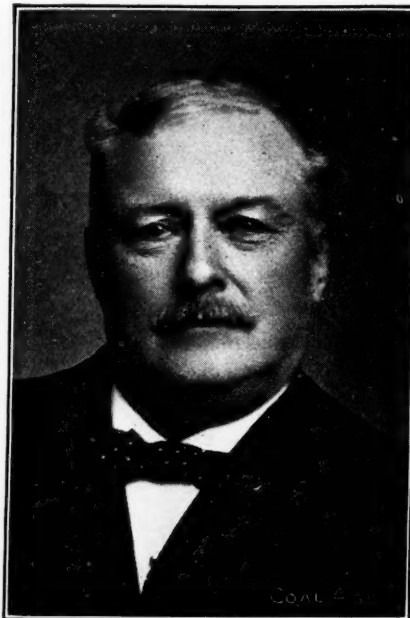
The world makes obeisance to the fellow, who, from patched trousers and poverty, is able finally to lift his head above the struggling masses, with the stamp of success attached to all his efforts. To struggle is one thing, and to win another. Both do not always go hand in hand, but when they do the world gets a shining example of pluck and energy.

A goodly number of men succeed. Some get further ahead than others. But up in the Wyoming Valley of Pennsylvania, where so many fortunes have been made in wresting riches from mother earth, there is no better example of that old adage—"If at first you don't succeed, try, try again"—than the life of Joseph L. Cake, independent coal operator of West Pittston.

HAD THE ADVANTAGE OF AN EDUCATION

While Mr. Cake had the advantage of a good education, he nevertheless struck out on his own hook, and made his success solely through great effort. Day and night he toiled in his early career, and when obstacles appeared which ordinarily dampen the ardor of other men, he found a way about them, and by a series of practical "ups and downs" he kept to the path which terminates at the goal of success.

He was born at Port Republic, New Jersey, and was the son of Joseph E. and Anna Cake, natives of that state. He was the eldest of three boys, and was reared at his birthplace, where he attended



JOSEPH L. CAKE

school and fitted himself for a course at Pennington Seminary.

Upon completion of his preparatory schooling, he entered the Polytechnic Institute of Philadelphia, and here received his technical training. In 1866 he went to Pittston in the interest of the West Pittston Coal Co. Admirers of Mr. Cake in his home town today point out that when he entered the village his clothes were threadbare, and he carried little else with him save a lofty ambition and a determination to make the race of life a complete success.

BECAME IDENTIFIED WITH LEHIGH VALLEY COAL CO.

Two years later, "J. L." became identified with the Lehigh Valley Coal Co., and for the next 10 years was in the employ of this corporation, serving in different capacities. He was next engaged in the construction of the Bound Brook R.R., and at the end of 16 months when this task was completed, he was temporarily without a position.

About this time he heard the call of the South and went to North Carolina, where he was identified with mining interests for a period of two years. It was then that he decided to return and fight it out in the district he had left, and he came north to Pittston, where in 1882, in company with A. McDeWitt, he opened the Clear Spring coal mine. Since that time he

has been blessed with good fortune, and his colliery soon took rank as one of the best of the independent operations in the whole anthracite field.

Today Mr. Cake is president and general manager of the Clear Spring Coal Co. and has several hundred men in his employ. He mines as much coal as the biggest of the independent operators, and considerably more than most of them. He now has two collieries in operation, and by applying himself diligently to the task of making his investment a paying one, he has found the way to wealth and power. His interests are at present so heavy that he has his son, J. Paul Cake, connected with the company as assistant manager.

"J. L." is widely known throughout the entire Wyoming Valley, but has never aspired to public office, being content to guard his mining interests. He is a firm believer that too many irons in the blaze may spoil the fire, and, as a consequence, has given practically his undivided attention to mining coal.

HONORED BY GOVERNOR TENER

His worth as a mining man was recently acknowledged when Governor John K. Tener appointed him as a member of the Mine Code Commission, to represent independent coal operators on the Board. In this capacity he has a big position to fill, but the interest he has already manifested in his new work is proof that his heart is in the task, and that when the undertaking is complete he will have well guarded the trust imposed in him.

Mr. Cake is one of the directors of the First National Bank of Pittston, and is one of the moving spirits in the Citizens Illuminating Co., a concern which supplies light to the entire upper end of the valley.

He has been prominently connected with the Methodist Church of West Pittston, and his philanthropy stands out in the shape of a handsome Sunday-school room, which he presented to the congregation at a cost of \$15,000.

Mr. Cake is about 60 years of age, but in spirit is a much younger man. While it took him several years to get a sound starting point, he nevertheless made good, and today is one of the most admired men in northeastern Pennsylvania.

He believes that to avoid mistakes we should regard our times of depression and discouragement as symptoms of disease, and should not make decision, or take action, on important matters when such moods are on us.

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This journal is interested solely in matters relating to the fuel industries, and is designed to be a medium for the free interchange of ideas, the detailed description of coal-mining practice, and the expression of independent thought calculated to benefit both operator and miner.

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COAL AGE

Fire Protection for Mines

The National Fire Protection Association, at its 15th annual meeting, held May 23, 1911, appointed a committee known as the Mine Fires Committee, to consider more specifically the protection of all mining operations against fire, including the surface plants and underground workings of mines. The committee as appointed included many of the engineers in charge of the work of the Federal Bureau of Mines, as well as a number of the leading mining engineers in the country, who by their experience are acquainted with the need of adequate fire protection and familiar with the means to be adopted for its accomplishment.

The committee organized and held its first meeting in Pittsburgh, Penn., Nov. 1, 1911. A second meeting was held in New York, Jan. 16, 1912. The chairman of the committee is Herbert M. Wilson, engineer in charge U. S. Bureau of Mines, Pittsburgh, Penn., and the secretary, R. Y. Williams, mining engineer U. S. Bureau of Mines, Urbana, Ill. The other members of the committee are: Albert Blauvelt, J. Parke Channing, Washington Devereux, B. W. Dunn, Ira H. Woolson, J. W. Paul and R. V. Norris.

This committee has just issued a brief advance report, or outline of the work formulated since its organization. The report deals mainly with a suggested division of the work of the committee, according to a plan that in their judgment will give the best results in the shortest period of time. It is recognized at the start that the U. S. Bureau of Mines is better equipped and qualified to conduct certain investigations relating to the origin, control and prevention of mine fires.

This branch of the work is, therefore, practically delegated to the Bureau to accomplish, and the engineers of that federal department are also expected to undertake the collection, tabulation, discussion and publication of such statistical data as may be obtained. The report further deals in a suggestive way

with the protection of surface plants, the construction of mine openings, and the planning and equipment of underground workings. It is, in brief, a good outline of work that cannot fail to benefit all mining operations and be appreciated by every class of mining men, if the same is systematically carried out, which the personnel of the committee makes it safe to predict will be the case.

In this connection, it will be of interest to draw attention to the article in this issue of COAL AGE, by Thomas Davies, mine foreman of the Davis Colliery Co., Bower, W. Va. Mr. Davies describes a method, which after much consideration and study he believes will form a basis for laying out underground workings in coal mines, so as to minimize the spread of an explosion and enable the quick recovery of the mine and the rescue of the men entombed, who may not have been injured by the explosion, but are in danger of being suffocated by the deadly gases produced.

While Mr. Davies claims originality for the scheme proposed, he does not, for a moment, assume that the plan is perfect in its detail, and is anxious that the same shall be criticised and discussed by practical mining men, with a view to its betterment, or the possible adoption of another plan growing out of this one, which will present improved conditions. We hope the plan suggested in Mr. Davies' article will receive the careful attention it deserves, and shall be glad to print in another department any discussion of its merits or demerits.

The Panama Canal and the Coal Trade

There is considerable speculation as to what effect, if any, the opening of the Panama Canal will have upon our coal industry. That the productive capacity of our coal mines far exceeds the consumption, is too well known to require discussion here, and it is the opinion of many of those well informed on the

situation, that the opening of the canal will be a large contributing factor toward providing a market for this excess production.

It is certainly reasonable to believe that the development of our merchant marine would materially increase our foreign coal trade, and undoubtedly the opening of the canal will witness a substantial increase in this service, not only as regards the foreign trade, but the coastwise as well.

It is almost impossible to conceive the enormous changes in established channels of traffic, which must necessarily follow the opening of the canal. These changes can only be toward the United States, or closely contiguous territories, and will present unlimited opportunities for establishing coaling stations to market our product.

The United States is now supplying about 9 million long tons per annum for bunkering purposes, while Great Britain is furnishing about 20 million to vessels in the foreign trade and $2\frac{1}{2}$ million to those in the coastwise trade. Thus the two greatest coal-producing countries of the world are supplying over 30 million tons directly for bunkering. Since we are by far the largest producer in the world, and with our position strengthened by an intimate connection with this new sea highway, it seems but natural that we should supply the greater proportion of this tonnage. The opportunity afforded the producing companies for entering into competition for this trade will no doubt be eagerly grasped, but in doing so, they should not lose sight of the possibility of developing coaling stations as before mentioned.

To what extent the coastwise trade will be developed by the opening of the canal is still in some doubt, but close students of economic conditions are agreed that the changes which will be effected in the present transportation routes will be enormous. In fact, it is believed that these changes may be so great that they will make serious inroads on the business of the transcontinental railroads. A further probable change in traffic conditions will be that on inland waterways, especially those emptying directly into the ocean, as the development of the coastwise trade will materially stimulate traffic on these natural highways. Thus the Mississippi River, even at the present time

an important factor in the transportation of coal, will with the advent of this new trade probably double or treble its present tonnage.

The opening of the canal will doubtless find many coaling stations established on both the Atlantic and Pacific Coasts, convenient for coaling vessels in these trades. Care must be exercised in the selection of the location of these stations to insure that they not only be placed at the most convenient points for the vessels requiring them, but most advantageously to the producing fields as well.

First Aid Conferences

The anomalous feature about first aid in the mines is that it has neither a forum nor a voice. All the questions arising should be given a more deliberate consideration than they have received heretofore. This is the more necessary because those natural authorities on first-aid work, the medical men, are devoid of a knowledge of underground conditions, and but rarely treat men where the accident occurs. The assumptions they make are often based entirely on surface observation.

It is quite customary to teach first-aid corps, for instance, that a piece of wood laid over a wire will serve to act as an insulator and may be mounted by a rescuer with impunity. As a matter of fact, wood in the mines is usually quite damp and would probably be of little value in accidents of that character. Paper, which is also recommended, is not only easily penetrated by nailed shoes, but is often so damp that it is not likely to give any real protection from an electric current.

Certainly discussion is badly needed, and an organization should be established having that aim. Moreover, a few general rules should be drawn up noting the methods to be followed by the contestants in performing certain problems. There should be a full and recognized list of demerits, so that the umpires could have an unquestionable basis for their decisions. We do not hope that such a body would decide on hotly debated questions, such as the relative merits of the Prone and Sylvester methods. But it could condemn the use of the latter method when fractures made its use undesirable, and severely penalize its use in contests,

when the nature of the injury pointed forcibly to the greater value of the Prone method.

We teach that resuscitation should take place as soon as the victim can be reached. As a matter of fact, if the air is bad, it would be better to drag the patient to a point at which the ventilation is good. The action of dragging alone might help to aid recovery, but it is certain that to try to revive a man in the same air in which he has succumbed, or in air which is but little better, is foredoomed to failure.

Moreover, such rescuers as we usually find, are liable not to drag, but to carry the victim. One grasps the man by the shoulders, the other by the knees, and he is thus doubled like a jackknife, and his breathing organs are mechanically deflated till the journey is at an end. Probably neither the Prone nor Sylvester method will give so complete a systole as results from folding the human anatomy like a closed book, for the strain on the armpits does not lift the ribs outward and upward, as does an extension of the arms.

In any event when the use of the lungs has just been resumed, the most merciful act would be to drag the patient rather than to carry him, but we cannot see why under most circumstances he cannot be left lying at full length till a stretcher can be secured. To carry him as was done at a recent first-aid meet by shoulders and arms after resuscitation, is to stop the lung action, which has been but recently reestablished, and to expose the patient to death from heart failure.

First-aid meets have been conducted to stimulate public interest. What is now needed as much as these are first-aid conferences to determine principles and to control the meets. There is altogether too great an amount of difference in views as to the right courses to adopt. Each physician has his preferences and quietly condemns those who disagree with him. It would be better to thrash the problems out in a convention, so that the best practices might be brought forward prominently.

In fact, mine physicians would do well to gather together as has long been the custom of railroad surgeons. They have their own problems, different from those of the regular practitioners, and they would meet them more efficiently if they compared notes.

Discussion by Readers

Comment, Criticism and Debate upon Previous Articles, and Letters from Practical Men

Reducing Ventilation When Firing

My "Review of Iowa Mine Explosions," in May 11 issue of COAL AGE, was not intended to be a comment, or a criticism on any particular article published previously on a similar subject. It was simply a reply to four questions that of late were frequently asked me by mining men outside of our state in regard to the practice in Iowa mines of stopping or slowing down the ventilating fan previous to firing shots.

In replying to the question, "Does experience in Iowa mines show that the practice of slowing down the ventilating fan, at firing time, lessens the force of an explosion and makes it less destructive should one occur?" In answer to this question, in my last article, I gave a brief review and enumerated the comparative results of the principal explosions that have taken place in the mines of our state up to date: First, of those in mines in which the ventilation was *not* reduced when firing; and, second, of those in mines where the ventilation *was* reduced when firing. This was done in order that the reader might have, not only my own opinion or theory on the matter, but also to place before him the facts so that he could form his own conclusion as to the merit or demerit of the practice of stopping or slowing down the fan at firing time, in the mines of our state. There is nothing in my article that any one can rightly construe as intimating that a mine explosion depended on the speed of the fan, or that its severity or mildness was governed or modified, to any extent, by the speed of the fan.

That there are several important factors entering into the determination of a mine explosion, and that these should be considered when a full exposition of the subject is undertaken is not disputed. My former article, however, did not attempt to explain mine explosions, nor did it advance any theory as to their cause and prevention. It aimed to show no more or no less than the fact that, so far as the records of mine explosions in Iowa are concerned, the claim that slowing down the ventilating fan at firing time lessens the force of the explosion and makes it less destructive is not only not sustained, but the facts are decidedly against this theory.

The readers of COAL AGE will observe that in the issue of June 1, p. 1107, Mr. John Verner, in commenting on my

review of May 11, p. 1004, does not dispute the correctness of the records as I have given them, nor the results they show, but says my conclusion has no value. For the last 20 years Mr. Verner has been advocating his theory, and when acting as state inspector of mines recommended to the operators of mines in Iowa the slowing down of the speed of the fan at firing time, with the intent of decreasing the severity of explosions should such occur. The mines of our state (Iowa) have given his theory years of test, and the records of these tests show that the explosions that have taken place in mines where Mr. Verner's recommendation was practiced have been more disastrous than those that took place in mines where the ventilation was not changed.

Now, however, we are told that these tests "cannot have any value, because they are based solely on the unessential matter of the fan's speed, at different mines where the explosions occurred." Nothing would be more natural were an opponent of this theory to make such a statement, but coming from Mr. Verner, I am obliged to ask: Why has he for all these years been advocating the slowing down of the speed of the fan at firing time, unless it was for the fact that he believed in the value of such practice, at least to minimize the force of an explosion should one occur? If the speed of the fan, and the result therefrom, is, as he says, an "unessential matter," why does he advise to stop or slow down the fan at firing time? Is not his theory for diminishing the force of an explosion based on slowing down the speed of the ventilating fan, and thereby reducing the velocity of the air in the mine to that of comparatively still air, at firing time? If what he says is true, that the base on which his theory is founded "is unessential and of no value," the evident conclusion is that his theory has no value.

Mr. Verner refers to the efficiency of a certain fan at one mine and its inefficiency at another mine. This I readily concede to be possible, and it is frequently the case; but, in the actual practice of his theory, I fail to see where the efficiency or the inefficiency of a fan comes in for consideration. When a fan is stopped, or nearly so, its efficiency or inefficiency amounts to nothing. The sum total effect on the air current by the most inefficient or the most efficient fan, when not in operation, is the same.

Mr. Verner also says: "To prove or disprove that an increase or decrease of

draft tends to increase or decrease the violence of an explosion that may occur, it is necessary that the test be made in the same mine and under otherwise identical conditions," and further, "the opportunity for making such tests was afforded by the two explosions that occurred in mine No. 4 of the Cleveland Coal Co., Jan. 5, 1901, and Feb. 5, of the same year." I believe the result of such a test just as he states would certainly be the most accurate and decisive; but, in my opinion, the example he cites does not fulfil all the requirements of the test. We must bear in mind that the speed of the fan was slowed down, at firing time, in both of the above explosions. If a sufficient natural air current was circulating through the mine during working hours, why was it necessary to operate the fan at all? It is not likely the fan at this mine would be kept in operation unless it had been necessary to do so, and it is an indisputable fact that it was kept in continuous operation on the days above named, because the proper ventilation of the mine required it.

From the above facts we have a right to assume that Mr. Verner is comparing two explosions where a less volume of air was circulating throughout the mine, at the time these explosions took place, than what the state law required when all the men and mules employed in the mine were at work. The comparison he makes is not, therefore, between a lawful, brisk current of air and a small, still current; but between two comparatively small, still currents. Identical conditions are likewise lacking in the example he cites. It is true, the two explosions took place in the same mine, and possibly little more air was circulating in the second explosion than in the first; but the condition of the mine and the dust in it were certainly not the same, as the following data will show. We are not told how effective, if at all, was the natural ventilation in the first explosion; but we are told that the mean temperature of the outside air, on the day the explosion took place, Jan. 5, 1901, was 27.5 deg. F., and on the day of the second explosion, Feb. 5, of the same year, it was 5.5 deg. F.; and that the increased draft caused by the lower temperature on Feb. 5 was accountable for the greater violence of the second explosion as compared with the first.

No other factor or condition is credited by Mr. Verner as having anything to do with the increased force displayed by the second explosion. I wish to point

out that between the two above dates was a period of low temperature; not unusually low, however, for our state, at the above season of the year. The U. S. Department of Agriculture and Weather Bureau, Des Moines, Iowa (report for Jan., 1901, p. 10) gives the mean temperature at Chariton, Ia., the county seat of Lucas County, where these explosions took place, on Jan. 5, the day of the first explosion, to be 27.5 deg. F.; and on Feb. 5, the day of the second explosion, it was 10.5 deg. F. (report for Feb., 1901, p. 11). This makes the difference in temperature between these two days only 17 deg., in place of 22 deg., as reported by Mr. Verner. The mean temperature for the month of January, 1901, at Chariton, Iowa, was 27 deg. F., or 0.5 deg. lower than on Jan. 5, the day of the first explosion. The mean temperature for the first five days in February, 1901, at the same place, was 17.1 deg., or about 10 deg. lower than on the day of the first explosion. Therefore, however dry the mine and the dust in it may have been on Jan. 5, the unfailing laws of nature undoubtedly made them much drier by Feb. 5, the date of the second explosion. This gradual drying of the mine and dust may not have been perceptible, to a great degree, but was nevertheless going on just the same; and so, even if the same identical amount of air was passing through the mine, at the time of these explosions, we had good reason to expect greater violence from the second explosion than from the first.

Mr. Verner admits that there is no proof that the practice of slowing down the ventilating fan, at firing time, has prevented the occurrence of an explosion, in any Iowa mine. The most he claims for his theory is, that it is useful as a "palliative," and this, as I have already stated, the records of Iowa mine explosions do not sustain, but contrariwise. The weakness of such a theory, in actual practice, is very plain, even if we allow all that its author claims for it; for of what benefit to the unfortunate victim of an explosion is the fact that it was one of great or small force, if the minimum force is more than enough to extinguish or crush out his life? No one wishes to impress the importance of the part played by air, in our Iowa mine explosions, more than I do; and, particularly, do I wish to direct the attention of mining men, in our state, to the effects of cold air currents in mines, in the winter months, in drying out the mine and the accumulated dust. Proper emphasis should be placed on what air is silently doing in our mines, in cold seasons, before a dust explosion can take place, rather than on the effect it has on an explosion after one has occurred or while one is in progress. To seek practical preventive measures rather than to continue to rely on palliative ones must ever be our aim. In

my humble judgment, the things we should emphasize the most and the things we should strive the hardest to overcome, aside from the elimination of the practice of shooting off the solid, and the use of black powder in our mines, are the dryness of the mines and of the dust, and the low humidity and temperature of the air entering the mine, in cold seasons. Not only would the successful governing of these things act as a "palliative" to lessen the force of an explosion, should one occur, but it would also go far to prevent explosions taking place, in the mines of Iowa, under ordinary watch and care, which is of the greatest importance in coal mining.

Mr. Verner, besides, makes much of the fact that his theory is practiced quite generally throughout the mines, in our state. No good can come by discussing this point. Suffice it to say that it is a personal tribute to him if the practice of his theory thus prevails. No other man probably in our state has studied as much over the subject of mine explosions as has Mr. Verner. The confidence in his knowledge of the subject, coupled with the influence of the office he held for many years, in our state, naturally led many to adopt his theory without seriously questioning its efficacy. It is a fact, however, that this theory is practiced today by many who are in doubt as to its soundness.

R. T. RHYS,

State Mine Inspector, District No. 2.
Ottumwa, Iowa, June 10, 1912.

Booster and Tandem Fans

Letter No. 15—I have been much interested in reading the discussion on this subject, in COAL AGE. While it is not likely that this method of increasing the ventilation in mines will ever come into great prominence, still there are conditions that constantly occur in coal mining where the installation of a booster fan is both economical and beneficial.

Suppose, for example, a coal mine that has been operated under several leases, for a period of, say, ten or twelve years, has finally reached a stage in its development where the air in a certain district is insufficient at the working face. The roof is frail and, owing to the sweating in the summer months, falls badly. Each operator, under a new lease, has avoided cleaning up the airways or doing any extra work beyond what was absolutely necessary.

As an illustration of this, I recall that in a certain mine, during such a period, the air courses on one side of the mine had been extended to 6800 ft., and on the other side to 2500 ft. in length. There were more men in the long split than in the short one, and the quantity of air it was possible to circulate in this long split was

insufficient for the needs. A regulator in the short split seemed to have little effect to assist the circulation in the longer split. Investigation showed it would require about \$2000 to clean up the air course and put it in proper shape. The coal was poor and the mine had not been paying for some time. In order to continue the work, however, it was necessary to secure better ventilation in the long split. After due consultation, it was decided to make use of an old fan that was idle and set this up in the return airway. This was done at a cost of about \$25. The result was that the air in the long split was more than doubled.

Some of the writers, in this discussion, have claimed that a booster fan is an "unnecessary expense"; others regard the installation of a second fan on the same current "an impossibility"; while still others say there is "no merit" in such an installation, and its use is evidence of a poor system of ventilation. I believe the use of a booster fan, under circumstances such as I have described, is a great benefit and an economical arrangement.

In regard to tandem fans, suppose the first fan set up at a mine may have been capable of yielding 40,000 cu.ft. of air, which was more than was required, at that time and, for this reason, the fan was run at a slow speed. But, as the mine airways lengthened and the cross-section contracted, the volume of air constantly diminished until, finally, this fan was capable of producing only 25,000 cu.ft. of air in the mine. Something had to be done. The shortage of air was largely due to leaky doors and stoppings.

As the mine ventilating pressure is always greatest at the foot of the downcast, the leakage is greatest near the shaft bottom. If, now, a second fan is installed to work on the same current and is capable of passing as much air as the first fan, it will overcome much of the leakage of air; provided it is set at a distance far enough from the first fan. By overcoming this leakage of air it will build up the air volume to the original capacity of the first fan. It seems clear to me that the fan, in this case, takes care of one-half of the friction of the mine.

I have always thought that if the second fan was much stronger than the first it would create more or less of a vacuum, which would increase the efficiency of the first fan. This idea is somewhat strengthened when we notice that doors and stoppings that leak air from the intake to the return when the booster is idle leak from the return to the intake with the booster running. I must say, however, I would like to read an article on this subject that would be instructive and interesting, and outline correctly the principles involved.

Shelburn, Ind.

R. J. PICKETT.

Examination Questions

Selected from State Examinations, or Suggested by Correspondents

Selected Mining Institute Questions

Ques.—With a temperature of 32° F., what is the weight of a cubic foot of air when the barometer reads 29.2 in.?

Ans.—The weight of one cubic foot of dry air is calculated by the formula

$$w = \frac{1.3273 \times 29.2}{460 + 32} = 0.0787 + \text{lb.}$$

Ques.—Find the ventilating pressure in a mine when the downcast temperature is 60 deg. F. and the upcast 200 deg. F., the barometer being 30 in.; the depth of both shafts is 300 ft.

Ans.—First, find the weight of 1 cu.ft. of downcast air, at the temperature of 60 deg. F., barometer 30 in.; thus,

$$w = \frac{1.3273 \times 30}{460 + 60} = \frac{39.819}{520} = 0.0766 \text{ lb.}$$

Now find the motive column for the given upcast and downcast temperatures, in terms of downcast air (temp. 60° F.), and a depth of 300 ft.; thus,

$$M = 300 \left(\frac{200 - 60}{460 + 200} \right) = 300 \times \frac{140}{660} = 63.63 \text{ ft.}$$

The ventilating pressure in pounds per square foot is then,

$$p = 63.63 \times 0.0766 = 4.87 \text{ lb. per sq.ft.}$$

N. B.—The same answer would be obtained by finding the weight of one cubic foot of upcast air, at a temperature of 200 deg. F. and multiplying this by the height of motive column in terms of upcast air; thus,

Weight of 1 cu.ft. of upcast air,

$$w = \frac{1.3273 \times 30}{460 + 200} = \frac{39.819}{660} = 0.0603 \text{ lb.}$$

Motive column, in terms of upcast air,

$$M = 300 \left(\frac{200 - 60}{460 + 60} \right) = \frac{300 \times 140}{520} = 80.77 \text{ ft.}$$

The ventilating pressure in pounds per square foot is then,

$$p = 80.77 \times 0.0603 = 4.87 \text{ lb. per sq.ft.}$$

Ques.—A pump 12 in. in diameter is running at a piston speed of 100 ft. per min.; what is its capacity in gal. per min., allowing 15 per cent. for leakage?

Ans.—The sectional area of this pump is,

$$a = 0.7854 \times 12^2 = 113.1 \text{ sq.in.}$$

The piston displacement of this pump, running at a speed of 100 ft. per min., is,

$$113.1 \times 100 \times 12 = 135,720 \text{ cu.in. per min.}$$

There are 231 cu.in. in a gallon and, allowing for a loss of 15 per cent., the

actual discharge of the pump will be, $100 - 15 = 85$ per cent. of the piston displacement; giving for the discharge, in this case,

$$= \frac{0.85 (135,720)}{231} = \text{say } 500 \text{ gal. per min.}$$

Expressed in a single equation,

$$G = \frac{0.85 (0.7854 \times 12^2) 100 \times 12}{231} = 500 \text{ gcl. per min.}$$

Ques.—A pump is placed at the bottom of a shaft 250 ft. deep and discharges through a 3-in. column pipe; what is the pressure per square inch on the plunger of the pump?

Ans.—What is called the static pressure, or the pressure when the pump is idle, is found by multiplying the head in feet by the constant, 0.434; thus, Static pressure

$$p = 250 \times 0.434 = 108.5 \text{ lb. per sq.in.}$$

The size of the pipe is not concerned in finding the static pressure of the pump. When the pump is in operation, however, the friction of the water flowing through the pipe increases the pressure under which the pump must operate; or, in other words, increases the head by an amount due to the friction of the water flowing through the pipe. This is called the *friction head* and depends on the diameter and length of the pipe and the quantity of water flowing through it.

To find the friction head in this case, it is necessary to assume a certain discharge, say 140 gal. per min. The friction head for a pipe 250 ft. long and 3 in. in diameter is, then,

$$h = \frac{f l G^2}{8 d^5} = \frac{0.01 \times 250 \times 140^2}{8 \times 3^5} = 25 + \text{ft.}$$

The total head under which this pump must operate is then $250 + 25 = 275$ ft. The pressure on the piston of the pump, disregarding the friction of the valves, is therefore,

$$275 \times 0.434 = 119.3 \text{ lb. per sq.in.}$$

Ques.—How many kinds of rope haulage are there in use, in mines? Name them.

Ans.—There are four different kinds of rope haulage in use in mines; namely, (1) Gravity-plain haulage, in which the descending loaded cars are made to draw up the ascending empty cars. (2) Engine-plane haulage, in which an engine located at the foot or at the head of a plane is made to haul the loaded cars up the incline. (3) Tail-rope haulage, in which two ropes are employed, extending from

the winding drum of the engine, into the mine. The main rope is attached to the head end of the trip of cars that is to be hauled out of the mines, and its length must be sufficient to reach from the winding drum into the mine, and extend back to the inside parting where the trips are made up. The tail rope is double the length of the main rope and extends from the winding drum of the engine back into the mine, where it passes over a tail sheave at the inby end of the parting and is attached to the rear end of the trip to control the motion of the loaded cars as they are drawn out of the mines, and to pull the empties back into the mine. (4) Endless-rope haulage, in which there is but one continuous rope, which is kept moving in one direction. This rope, after passing two or three times around the winding drum, extends back into the mine and passes over a tail sheave at the inby end of the parting where the trips are made up, and from this point is carried out of the mine by a separate road or track and returns to the engine. In this system, the rope is always running and the cars are attached, at regular intervals, to the two branches of the rope, the loaded cars being drawn out of the mine and the empty cars taken in, at the same time.

Ques.—How many cubic feet of coal will a car hold, if the length of the car is 10.5 ft., its width 4.5 ft. and its depth 15 in.? Find the weight of coal this car will hold when the specific gravity of the coal is 1.3.

Ans.—The cubic contents of this car is,

$$10.5 \times 4.5 \times 1.25 = 59.06 \text{ cu.ft.}$$

If the specific gravity of the coal is 1.3, the weight of the solid coal is,

$$59.06 \times 1.3 = 76.78 \text{ lb. per cu.ft.}$$

It is customary to assume that broken coal occupies more space than the solid coal in the ratio, 5:3. This will make the broken coal as loaded in the car, about $\frac{3}{5}$ of the weight of solid coal. The weight of broken coal, therefore, in this case, is,

$$\frac{3}{5} (76.78 \times 59.06) = 2879 + \text{lb.}$$

N. B.—In calculating the weight capacity of mine cars it is customary to assume that one short ton (2000 lb.) of broken bituminous coal, or one long ton (2240 lb.) broken anthracite coal, each occupies 40 cu.ft. This makes the broken bituminous coal weigh $2000 \div 40 = 50$ lb. per cu.ft.

In the present case, if the cubic capacity of the car is, say, 59 cu.ft., the weight of coal this car will hold is $59 \times 50 = 2950$ lb., which is approximately the capacity of the car.

Sociological Department

For the Betterment of Living Conditions in Mining Communities

Dangers in Mines and Their Prevention

BY SIM REYNOLDS* AND W. H. REYNOLDS

Among the new factors in the mines of today are permissible explosives and shot-firers. Both are working their slow and tortuous way over the many rocks which seem always to beset innovation and reform in any line. To us the way to a solution seems open and simple; but then to the thinking man, coal mining, even in its most dangerous forms, presents but few problems which do not admit of possible solution. To get everybody connected with any given mine to look at things in the right light, there is the *real* problem. For instance, to show how perverse is human nature, let us consider for a moment the matter just mentioned.

Every one of the readers of this article understands of course that the powders tested by the Bureau of Mines are all in themselves safe. The extreme conditions under which the powders are tried out, prove this. But many are the brands which have been thus stamped with the approval of the United States Government. These all have passed at least five tests under increasingly dangerous conditions. Evidently such explosives would be more than safe in any mine under normal working circumstances. And used as the government intends they shall be, they are safe.

We have yet to see such a powder fail. Yet the shot-firer some night sets off a shot and finds that it has fired the gas feeders at the face. The next morning he makes a report to the manager or foreman. The latter starts an investigation and finds that the men have been borrowing powder from each other. Yet the English-speaking men at least know in general that each brand is warranted only when used alone. And, whenever men borrow from one another, if one man has evinced a partiality for this brand, and another for that, trouble will inevitably ensue.

MIXING OF POWDERS

The brands now on the market are not "timed" alike, some being "fast" and some "slow," and to mix them in the same shot is to render the mixture as dangerous as the old-time black powder.

Yet as we have said, despite this characteristic being common knowledge, so ingrained is the spirit of carelessness

that even in a matter so vital as this, chances are taken and a disaster is likely to occur.

Thus it goes throughout the whole range of dangerous possibilities. The personal element is the most important factor. We shall soon learn that education for adults who work in the mines is as essential as the education of children. Even the most ignorant of men can, if the demonstration be brought before him often enough, be made to realize what is best for him and his fellowmen. It only remains for us to put forth an effort to raise the standard of our human equipment equal with that which we have already devoted to the mechanical end of the industry.

We must educate those who are willing to receive education into a better understanding of those simple elements of mining, which affect the safety of property and life. We must maintain such discipline as is necessary to compel a fulfillment of the law's requirements and of such local rules as necessity may cause to be promulgated.

THE SQUIRE VERSUS THE JUDGE

Furthermore, there will need to be a radical change in the judicial procedure restraining the breaking of mine laws. It takes a determined mine foreman to go through such experiences as we ourselves have suffered in our effort to uphold the supremacy of the mine law over individual desire. Such difficulties inevitably result to every man, who under our present crude method of dealing with misdemeanors, endeavors to curb the wilful. It takes the idealism out of a man when, after finding a deliberate law-breaker, and haling him before a local justice, his case is sent up to Quarter Sessions instead of being settled right in the squire's office or home.

This might easily be changed if each mining institute and conference would pass resolutions toward that end, and would see that they were presented to the legislature of each state. For under the present system, in order that his case against the defendant shall not fail, the mine foreman, with the district inspector to whom he has taken the matter, is compelled of course to attend court and patiently or otherwise await his turn on the calendar.

And as none can apparently tell just when this turn will come, they sometimes spend several days at the county seat before getting justice. We recall one in-

stance in which we, accompanied by the district inspector, spent nearly a week at court in endeavoring to get a miner punished who had deliberately broken the law. Meanwhile a substitute perhaps is running the mine in a manner far from satisfactory to the foreman's employers, while he is being pestered by the seemingly interminable delay and by urgent calls from the mine.

Of course this is not always the case, but it does happen this way often enough to make any man wary and loath to invoke the law on an offender. Some cases are settled offhand, but if the defendant has a little money, just enough to pay the lawyer will suffice, the latter will do his best to get it "remanded to sessions." In fact, under the law, the justice has no jurisdiction.

And once they are in court we have known good, practical mine managers, men who were adepts in their own line, made a common laughing stock by the cross examinations of some gentlemen learned in the law who could not tell the difference offhand between a coal mine and a cider mill, yet who can, and do, for the consideration aforementioned, interject such an entangling and altogether irrelevant series of questions as to confuse and hold up to seeming ridicule the man who is losing time, money and patience in a proper effort to enforce the law.

Probably before the astute legal light gets through illumining the devious roads and by-roads by which Justice is sometimes approached, the man of the anemometer and safety lamp is taking a mental picture of himself and evaluating his mental effects as worth about "thirty cents," even if in the parlance of colloquial circles his brain and experience do not "look like" that decimal part of a dollar. Perhaps by the time the lawyer gets completely through with his questions, the mining official wishes he had "let the fellow go to —!" and is willing to let the offender have "his fool head blown off if he wants to."

The trouble lies in this fact, however, that it is not the fool's head alone which is blown off when the crucial period arrives. The careful miner and the law-enforcing official also swell the list of dead. And thus will it continue to be, even in our most up-to-date mines, until a persistent and radical and long continued effort has been made as a result of pressure exerted from every controlling side, to educate and discipline

*Pittsburg-Buffalo Coal Co., Marianna, Penn.

and punish if need be the more or less "green" material, which we must of necessity use at present in our mines.

THE LEGAL PENALTIES ARE FOR THE MINER'S PROTECTION

We may spend unlimited money in our "model" plants; we may purchase the finest machinery; and both by up-to-date systems and economical operation create for ourselves an enviable place among the list of coal producers, but until we educate the people to accept wholesome discipline and the rules of law as necessary to their welfare, we shall continue to have recurrent disasters. Ninety-nine out of one hundred employees have a lurking idea that the law is antagonistic to the interests of the working man. Until we remove this false idea from the minds of the men whom we wish to benefit, the extraction of coal in the Appalachian gas-coal region will ever be a "problem."

For there is something in the atmosphere which changes the green immigrant from an erstwhile law-fearing, well-disciplined unit in any industry to a careless, law-breaking and law-defying element in our industrial body before the first year of residence is past. It seems to be an integral part of human nature to run to extremes, and after being subject from his birth to the time when he lands here to the most rigorous scrutiny of the law, he finds the taste of liberty sweet and proceeds to get drunk on it.

We of the gas-coal region can never hope to mine coal safely until the mine official feels the responsibility of his office, enforcing the law regardless of his personal convenience, and until the uncertain and circuitous mode of dealing out justice is replaced by simpler methods of adjudication.

First Aid at Lewisburg, Ala.

BY J. F. SMITH*

The Alabama Consolidated Coal & Iron Co. takes great pride in the efficiency of its first-aid work, which is now established at Lewisburg, Ala. The first-aid society was organized several months ago and it rapidly gained favor among the men, who were quick to appreciate the necessity of a practical knowledge of the human body and of the treatment of ordinary injuries.

Each member was given a copy of the manual used by the New York First-Aid Society, and a life-size manikin was obtained. I gave practical demonstrations in first-aid work and was aided by Dr. Thomas A. Cheatham, of Birmingham, who gave a series of lectures. The class was industriously quizzed by Dr. George B. Scott.

The general instruction given the so-

*Mine foreman, Alabama Consolidated Coal & Iron Co., Lewisburg, Ala.

ciety as a whole was soon found to be inadequate to meet all emergencies, and five teams of five and six men each were organized for special training. The wisdom of this step is no longer a matter of the slightest doubt, as the value of team work has been fully demonstrated.

An interesting feature is the junior team, which is made up of boys about fifteen years of age. It is surprising to note that the boys are more enthusiastic and quicker to learn than their friendly rivals of mature years. They have done very creditable work and feel slighted if not given the first chance in every emergency.

TWO UNDERGROUND HOSPITALS

Methods of handling injured miners



THE JUNIOR FIRST-AID TEAM AND ITS INSTRUCTORS, LEWISBURG, ALA.

have been carefully studied and to facilitate matters, two emergency wards have been built inside the mine. The Scott ward is located in the eastern part of the workings, a half a mile from the mouth of the slope, at a point where all cars from that part of the mine must pass.

The Cheatham ward is found in a similar position on the western side, two miles from the mouth. Both wards are equipped with hospital cars, stretchers, first-aid cabinets and surgical dressings of all kinds.

No effort is made to detain a patient in these wards after first-aid has been rendered, but that section of the mine stops work long enough for the hospital car to be rushed to the surface and the patient is taken to the Mary Lee Hospital (close at hand), and given the benefit of treatment by the resident surgeon in an operating room with all modern conveniences.

Lewisburg is also coming to the front in regard to helmet men. I have had

quite a little experience in helmet work, have completed a course of instruction at the Bureau of Mines, in Birmingham, and several of my men are taking this course at the present time.

Much attention is paid to sanitation and the decrease in sickness has been so marked that the sanitary officer finds his task a pleasure and seldom finds it necessary to use authority in enforcing rigid sanitary rules. The value of sanitation has been indelibly impressed on the citizens of Lewisburg and camp cleanliness is a matter of personal pride.

The photograph shows the outside of Scott Ward with the Junior team ranged in front. The mine foreman is on the left with Dr. Cheatham close by. Dr. Scott can be seen toward the right.

Relative Danger of Anthracite and Bituminous Mines

According to Edward Parker, statistics show that mining in the Pennsylvania anthracite region is more hazardous than in the bituminous region of the same State, although a larger number of men have been killed by explosions of dust and gas in the bituminous mines than in the anthracite mines. From 1885 to 1909, there were 11,491 fatal accidents in the anthracite mines of Pennsylvania. During this period there were also 23,973 nonfatal accidents. Of the 11,491 deaths only 874, or a little less than 8 per cent., were due to gas explosions. In the bituminous mines there were 6366 deaths from 1891 to 1909; 1067 were due to explosions of gas or dust. Falls of roof killed 5001 men in the anthracite mines during the last 25 years and 3909 in the bituminous mines during the last 19 years.

Coal and Coke News

From Our Own Representatives in Various Important Mining Centers

Washington, D. C.

The House of Representatives received (July 8) from the Judiciary Committee impeachment charges consisting of 13 articles of impeachment, against Robert W. Archbald, a justice of the Commerce Court. The impeachment charges allege improper conduct on the part of Judge Archbald in connection with transactions in coal lands. The testimony shows that after he had been promoted to the position of United States circuit court judge, and had been designated as one of the judges of the Commerce Court, he, in connection with different persons, sought to obtain options on culm dumps and other coal properties from officers and agents of coal companies which were owned and controlled by railroad companies. The Judiciary Committee further charges that in order to influence the officers of the coal companies which were subsidiary to and owned by the railroad companies, Judge Archbald repeatedly sought to influence the officials of the railroads to enter into contracts with his associates for the financial benefit of himself and his associates. Other articles upon which the committee asserts Archbald should be impeached set forth the alleged negotiations for purchase of a dump from the Lehigh Valley Coal Co.; the alleged deal with Frederick Warnke, of Scranton, Penn., in coal lands owned indirectly by the Philadelphia, Reading Co.; and Archbald's claimed participation, when a district judge, in a Honduran mining enterprise. Another article charges that Archbald improperly attempted to use his influence as judge with the Lehigh Valley to secure interest in the Everhardt coal lands of Pennsylvania.

It has now practically been determined to defer until next winter all serious legislation regarding coal fields in Alaska. There has been little possibility of securing any general legislation at this session, owing to the very widely divergent views on conservation and Alaskan conditions generally. No satisfactory prospect of action next winter appears to be in sight at present but there is now much talk of an extra session of Congress to start shortly after March 4, 1913, in the event the Democratic party is elected, at which legislation that has not received due attention in the past session or two would be taken up and disposed of. It is stated that the Alaskan situation with special reference to the coal

question would in that event be carefully considered. There has been a decided growth of opinion in favor of the proposed plan of leasing coal lands on favorable terms to private persons with a government railroad to run through the coal fields and thereby assure transportation on equal terms to all persons who are engaged in mining coal. This plan may be a good deal modified when the actual work of framing a measure is undertaken.

Strong efforts are being made in Congress to secure the insertion of provisions in some one of the appropriation bills that will extend the labors of the Bureau of Mines so as to take in metal mining to the same extent as coal mining is at present considered by the Bureau. The claim is that the metal mining situation is quite as worthy of scientific attention of this sort as is coal mining but that the Bureau has been unduly disposed to concentrate its attention on coal mining to the exclusion of the other classes of work. The Bureau is considered to have adopted this point of view largely as a result of desire to avoid crossing the path of the Geological Survey any more than was absolutely necessary, while at the same time the funds it has had available have not been sufficient to extend the service as widely as many persons would have liked. If nothing is accomplished in this direction at the present session, it is probable that some action of the kind will be obtained next winter. The matter is not yet closed but provisions to the desired effect may yet be inserted in some one of the pending bills.

Alabama

Birmingham—The semi-annual examination for mine foremen and firebosses of Alabama, is to be held July 22 to 26, inclusive. Notices have been posted by chief mine inspector C. H. Nesbit. The other members of the board are E. Ramsey, J. H. Tidmore, W. N. Hillhouse, C. McCormick and T. H. Tinney.

The United States Bureau of Mines has reopened its mine-rescue station here. A. R. Brown is in charge.

Indications tend to show that the production in Alabama for the year 1911, will reach about 17,000,000 tons, the high-water mark for Alabama.

Colorado

Florence—The work of sinking the

new shaft for the Colorado Fuel & Iron Co. to connect with the Canfield mine, southwest of Coal Creek, is progressing rapidly. The present depth is about 150 ft., and an average of 85 ft. per month is being maintained. At this rate the remaining 240 ft. yet to sink will require less than 2½ months. A new concrete fanhouse is in the course of construction and excavations are being made for the scales and other necessary equipment.

Illinois

Jacksonville—While drilling for oil on the Morgan and Sangamon County Line, the Ohio Oil Co. claims to have struck a bed of coal 5 ft. thick, at a depth of 280 ft. The drilling for oil has been unsuccessful.

LaSalle—Three mine-rescue cars have been touring the mining camps throughout the state since November, and, as a result, 758 coal miners have been trained in helmet work and first aid to the injured. The primary purpose of the cars and stations is to train the miners so that, in case of mine accidents, they will be prepared and equipped to render quick and efficient assistance. There are now 478 men holding certificates as helmet men.

The Department of Mining Engineering at the University of Illinois is just completing a new mining laboratory 100 ft. long by 42 ft. wide. It is divided into two sections, one for the treating of ores and one for the washing of coal. The building is equipped with an 18x20 Jeffrey coal roll, a Williams pulverizer, and an Allis-Chalmers gyratory crusher and a Colorado Iron Works, 12x12 roll for ore.

Another feature of the mining department is the new blasting and explosives laboratory. There is also, in the course of construction, a new rescue station for giving training with oxygen and other rescue appliances.

Indiana

Anderson—Another consolidation has been effected by Joseph Zeigler and Chas. K. Bagot, who recently purchased the Epperson coal yard and the General Cement Products Co. This time the M. M. Miller coal yard has been purchased. The work of moving the Miller coal-yard effects to the Epperson coal yard and the transferring of the General Cement Products Co. plant also to the Epperson coal yard will commence soon.

Brazil—Since the constitution of the United Mine Workers of America does not permit regular coal miners to mine clay, considerable hardship is imposed on the miners in district No. 8, where so much clay is mined, as the work must, under the constitution, be done by clay men. A meeting of the miners and operators was held, July 5, with a view to adopting a plan whereby the miners will be able to mine clay.

Indianapolis—In regard to the Act of 1905, which revised the laws in relation to coal mines in Indiana and provided for safety of persons employed in mines, Attorney General Honan, in response to an inquiry by Frank I. Pearce, State Mine Inspector, decided that the statute does not apply to a place where coal is mined by removing all superimposed earth, as that makes the place a pit and not a mine.

The steps taken for the recall of the officials of District No. 11, United Mine Workers of America, in compliance with a provision of the district constitution, are raising considerable comment. The call for a convention has been issued for July 25, and was signed by the officials of 11 or more local unions, giving for its purpose the investigation of the action of the Indiana officials during the Cleveland convention, in March, when the Indiana miners' demands for the weekly pay were sacrificed for the good of the national organization. It is said, however, that the real purpose of this special convention is to take advantage of the new provisions in the constitution for exercising the recall of District President and Vice-President, W. D. Van Horn and D. W. Lacky, respectively.

Patrickburg—A complaint has been registered by the workmen of the pit here, who quit work several weeks ago on a strike, that the State Employment Bureau, through the Terre Haute agency, is sending laborers to the place to help break the strike. The Terre Haute agency claims that it has quit sending men to the Patrickburg pit.

Kansas

Pittsburg—It is said that the oil burners on the Frisco will again be converted into coal burners. The change to oil was made when that fuel was cheap on the market, but the rise in the price of oil and the better service given by coal have brought about the change back to the latter fuel.

Kentucky

The possible effect on the consumption of steam coal of the construction of numerous water power plants in this state is considered as serious by far-sighted coal operators, since the central stations are heavy consumers, and if the steam plants were to be shut

down and water power used entirely, the amount of coal used in the manufacture of the electric current would be reduced enormously.

Elys—The plant of the Hughes-Jellico Coal Co. has been purchased by a company from Barberville composed of A. M. Decker, F. H. Gaddie and S. H. Hughes. The plant costs \$50,000 and the equipment is electrically operated. The new owners have made no plans as to the improvement of the plant.

Paducah—The West Kentucky Coal Co. will begin at once the construction of 40 barges that will cost an average of \$2500 each, or a total of \$100,000. The company has received five carloads of the finest Oregon cypress gunwales for use in the barges.

Pine Hill—The Kentucky Portland Cement & Coal Co. has recently established offices in the Lincoln Building, Louisville, in care of J. W. Dreisbach, General Superintendent, while the work at Pine Hill is in charge of M. A. Steckel, Superintendent. Mr. Dreisbach is making purchases of equipment for the coal and cement plants and drawing the plans for the latter. The old opening at Pine Hill is not being used, but a new bed, 48 in. thick, is being worked. The capacity of the mine will be about 500 tons a day.

Roes Run—Five hundred mine employees at the Roes Run mine are reported to have struck for a 25c. increase in their daily wage scale. The mines have closed down.

Louisiana

New Orleans—The old shed 21, owned by the Illinois Central R.R. and now used by the Andrews Coal Co., crumbled and fell to the ground a ruin of timber, bricks and slate. The Andrews Coal Co. had stored under the shed considerable coal and a large number of carts. No one was injured.

Nebraska

Omaha—Omaha dealers say they will have to pay 45c. more a ton for anthracite at the mines, and the consumers will be charged for it. Hard coal, which sold for \$10.50 a ton last winter, will cost Omaha people \$11.50 a ton. Labor trouble is the excuse of the miners.

New York

New York—New York City is now practically cut off from any immediately available fresh supply of the ordinary domestic sizes of anthracite coal. This is because of the demand from smaller cities and from towns in the eastern part of the country, which did not stock up on anthracite last March and April, when the miners were preparing to close down.

Ohio

Youngstown—An application for a receiver for the Fowler Mining Co., with

mines at Jackson Center, has been made in the Court of Common Pleas. The liabilities are \$40,000, and an appraisalment will be made on the properties at once.

Pennsylvania

BITUMINOUS

Connellsville—James E. Roderick, Chief of the State Department of Mines, has assigned to Mine Inspector P. J. Walsh, 17 new mines and has taken away three, adding 14 to his previous list.

Mt. Pleasant—A string of cars in the Carpentertown Works of the Mt. Pleasant Coal & Coke Co. became unmanageable and dashed down the slope to the bottom of the mine, injuring several men, one fatally. Timbers, loosened by the runaway cars, were hurled upon a cage containing six men. All were bruised by the impact.

Scottdale—The last coal at the Franklin plant has been mined, and the mine is to close forever as a coal producer. It was opened in 1879, and for 33 years has had continual service, save for about 21 months' time.

Windber—The first accident of any kind for two weeks among the 7000 miners employed by the Berwind-White Coal Mining Co. occurred shortly after midnight when the fall of slate in mine No. 37 caught and severely injured Aicx Woine.

ANTHRACITE

Philadelphia—Considerable coal is being constantly dug out of the Susquehanna River by the people of this vicinity. It is either washed down from the culm piles by the rain and carried into the river, or dropped overboard from coal barges.

Pittston—Because a slate picker at Butler breaker, of the Hillside Coal & Iron Co. was discharged for disobeying orders, about 300 men and boys employed at the colliery failed to report for work. The colliery was obliged to shut down on account of lack of coal. The miners in sympathy with the slate picker are mostly employed in the Butler slope, and the Thomas shaft.

Pottsville—The Harvey mines, near Conyngham, which have been for a long time abandoned because of water, are to be reopened soon.

Scranton—About 1400 employees of the Lackawanna Coal Co. are idle at its Sloan mine, as a result of a strike caused by a number of laborers who are demanding increased wages. Efforts of the officials of the company and miners to have work resumed and the grievances brought up in the proper way have been fruitless. A mass meeting has been called at ague Hall.

The home of Michael Crane, on Ripple St., has been quite badly damaged by a cave-in. Three other cave-ins have been reported recently, the most serious of which occurred on Cedar Ave., causing a

water main to burst and flooding the workings of the National mine.

State College—A score or more of students from State College, headed by several professors from the Engineering Department, are intending to go to the Connellsville coke region on July 15. The intention is to spend a short time making actual investigations, tests and experiments. Already permission has been granted the students by the larger coal and coke companies to thoroughly investigate the mines there.

Wilkes-Barre—At the very point where anthracite coal was first discovered in 1794, the fire, which has been burning in the bowels of the earth at Summit Hill for 60 years, is rapidly burning back from the huge concrete wall sunk by the Lehigh Coal & Navigation Co. in order to prevent the fire from reaching the mammoth vein in the Panther Creek valley.

One thousand miners and laborers went on strike recently in the Wyoming Valley. At Nanticoke, 500 men employed by the Susquehanna Coal Co. went out because a number of men refused to join the union.

Two hundred car drivers in the Nottingham colliery of the Lehigh & Wilkes-Barre Coal Co. went on strike, causing the colliery to shut down indefinitely. The driver boys claim that several of their fellow drivers were discharged on account of coming to the surface for their pay at noon on Saturdays. They say that if they do not come to the surface at noon for their pay, they often miss it later in the afternoon and are compelled to lay off work and come to this city the following day.

Williamsport—One of the longest and heaviest trains that has ever been hauled over the lines in this section passed through here recently. It had 112 cars, all loaded with bituminous coal and was coming from the Clearfield district. It was estimated that the train carried about 8000 tons of coal.

Tennessee

Coal Creek—An order known as the Grand Mine has been formed recently by E. F. Buffatt. Subsidiary to the general order, the Society of Tennessee Mine Foremen has been formed, and subsidiary to this last organization is the local Society of Mine Foremen. Application has been made for the organization of Virginia Society of Mine Foremen and the promoters are hopeful of seeing it become an important national organization.

The purposes for which these organizations of mine foremen stand are clearly set forth as follows:

To exchange ideas and help each other in the study of the science of mining;

To assist members in finding employment and to help each other in times of distress;

To promote measures of safety and devise ways and means for the prevention of mine disasters;

To promote the establishment of federal and state mine-rescue stations with suitable equipment;

To raise funds for the purpose of purchasing light mine-rescue and first-aid equipment and establishing small rescue stations;

To organize rescue corps for the purpose of studying methods and apparatus for rescue work and to give aid in case of mine disasters;

To improve its members in the knowledge of the first aid to the injured and to organize first aid corps for actual service at the various mines and for service in case of mining and other disasters;

To assist the state and federal mining departments in the promotion of their work;

To assist in the enforcement of such present mine laws as we deem just and wise;

To work for the repeal of unjust or defective laws and to influence the passing of such additional laws as may seem to be to the best interest of safety and improved mining methods.

The interchange of ideas and discussion of mutual problems of these men similarly employed, will undoubtedly reflect in lower cost to the mine.

Utah

Salt Lake City—The reorganized corporation of the Black Hawk Coal Co. has just begun a series of improvements at and around the Black Hawk mine, that will necessitate expenditures amounting to \$150,000. Material is now on the ground at Black Hawk for fifty new miners' cottages, which will be erected at once. The company also is putting in automatic box-car loaders, electric locomotives, undercutting coal machines and railroad-yard betterments. The mine is now capable of producing 1000 tons daily, but after these improvements have been made the capacity will be doubled.

Washington

Spokane—Twelve million dollars will probably be expended by the Northern Anthracite Syndicate, recently organized by Andrew Laidlaw, in Eastern Canada, in developing 12,800 acres of coal land in the Ground Hawk mountain district, of British Columbia. The work is expected to occupy three years, and it will include the building of a railroad from the fork of the Skeena and Stikane Rivers to the mouth of the Masa River and Nasota Gulf, also bunkers at points on the Pacific Coast. Surveys were started this spring.

West Virginia

Borderland—The Norfolk & Western is about to erect a new concrete coaling station at a cost of \$22,000. The structure is to be of reinforced concrete and the tipples will be built over the center of the tracks, 54 ft. above them. The pocket will be so arranged as to load a

tender with the tracks. The capacity of this coaling station will be 700 tons.

Charleston—The labor trouble along Paint Creek, Kanawha County, is likely to assume large proportions before the matter is settled. On July 1, attorneys representing the miners asked for an injunction to restrain the coal operators from maintaining a guard system, operating a gatling gun and from ejecting the miners from their homes without due process of law. It is alleged that the guard employed by the coal company has interfered with the citizens in securing their mail, and has threatened and even beaten them. On the other hand, the coal companies claim they have been compelled to protect their property, and in order to operate their mines found it necessary to require the men who refused to return to work to vacate the company houses so that new men could be employed. The miners for some time have been heavily armed with Winchester rifles and are able to take care of themselves in a pitched battle, which many predict is near at hand.

Wisconsin

Milwaukee—The Interstate Commerce Commission has promised an investigation into the increase in prices of city coal here. There has been considerable agitation against wholesale and retail dealers, who have put the price of coal up 25c. per ton, since the settlement of the trouble in the mines with the miners.

Superior—A fire, believed to have been started by flying sparks from a locomotive, threatened for a while to do serious damage at the dock of the Great Lake Coal & Dock Co., on the St. Louis bay front recently. Two cars loaded with coal and the floor of the dock for an area of 100x10 ft. were burned.

England

Conisborough, Yorkshire—On July 9, the Cadeby mine was the scene of a double disaster, when an explosion occurred, killing 32 out of the 34 miners in the main colliery, followed shortly by a series of explosions which killed 42 members of a rescuing party. Among these latter victims were District Inspector W. H. Pickering, Doncaster, Senior Assistant Inspector H. R. Hewitt, Sheffield, and Junior Assistant Inspector G. Y. Tickle, Doncaster. From present reports we gather that the list of fatalities may reach 80. During the last 30 years there have been 56 gob fires in the Cadeby and Denaby main collieries, as has already been stated in COAL AGE, Feb. 24, 1912.

Germany

Osterfeld—Fourteen miners were killed here on July 3 by an explosion of fire-damp in one of the pits in the Osterfeld colliery, near Oberhausen.

Personals

C. F. J. Galloway has been examining a coal property on Graham Island of the Queen Charlotte group, British Columbia.

W. H. Soper, traffic manager of the Fort Ridge Coal & Coke Co., of Middlesboro, Ky., was married July 10 to Miss Adele Smith, of Jacksonville, Fla.

J. B. Hoenig, state geologist, has taken charge of the office and has established headquarters at Frankfort, the state capital. The office of the geologist heretofore has been at Lexington, where the Kentucky state university is located.

R. T. Stuart is now mine manager at the Corbin Coal and Coke Co.'s colliery, having succeeded T. H. Williams after the latter had been appointed a provincial government mine inspector for the district of Southeast Kootenay, B. C.

John P. White, president of the United Mine Workers of America, will spend a month in the anthracite region and attend the convention of District No. 1. Steps have been taken by the local union to treat their chief to a grand reception.

G. G. Crawford, president of the Tennessee Coal, Iron and Ry. Co., has left for New York to attend a meeting of the president of the various subsidiary companies of the United States Steel Corporation. He will be gone several days.

Francis Feeham, president of District No. 5, United Mine Workers of America, recently created a surprise in Pittsburgh labor circles and elsewhere throughout the country by submitting his resignation, in spite of his complete vindication by the investigation committee.

Morris Knowles, civil and sanitary engineer, has completed his work for the Alabama Coal Operators' Association and has issued several bulletins touching various phases of mine and mine camp sanitation. He returns to Pittsburgh but will maintain a branch office at Birmingham, Ala.

Announcement has recently been made that Robert Clark, of Indianapolis, and two Terre Haute coal operators are planning to establish a large coal-briquetting plant, at Terre Haute, within a short time. The plans for establishing the new industry are along the lines proposed a year ago.

Obituary

Edward A. Skae was instantly killed by his motor car while riding to his country home last week. Mr. Skae was a prominent Detroit capitalist, being president of the Gemmer Manufacturing Co., president of the Hammond Building Co., a director of the Peninsular State Bank, vice-president of the Federal Motor Truck Co., and a director of the Superior Land Co. Up to a year ago he had been prominently connected with the coal business.

Chronology of Coal Mining for June

June 1—Striking miners were evicted from company houses of the Great Lakes Coal Co.

June 3—The miners on strike at Terre Haute, Ind. returned to work.

June 5—The fight between the strikers and the civic guards at Madrid, Spain, resulted in the killing of one man and seriously injuring several others.

June 10—The wage scale between the miners and operators of Pomeroy Bend, Ohio, was signed.

June 10-11—Conference of operators and superintendents at Lexington, Ky., to discuss the methods of preventing accidents.

June 21—Interstate Commerce Commission denied further reductions in freight rate on bituminous coal from the Pittsburgh district to the Great Lakes.

June 28—Twin Shaft fire at Pittston, Penn.

Publications Received

GOVERNMENT COAL PURCHASES UNDER SPECIFICATIONS WITH ANALYSIS OF THE FISCAL YEAR, 1909-1910. By G. F. Hope; with a chapter on the fuel-inspection laboratory of the Bureau of Mines, by J. B. Davis. Bulletin No. 41, U. S. Bureau of Mines, 1912. 97 pages, 6x9 in., 3 plates.

THE CONSTITUENTS OF COAL SOLUBLE IN PHENOL. By J. C. W. Frazer and E. G. Hoffman. Technical paper No. 5, U. S. Bureau of Mines, 1912. 20 pages, 6x9 in.

THE STATUS OF THE GAS PRODUCER AND OF THE INTERNAL COMBUSTION ENGINE IN THE UTILIZATION OF FUEL. By R. H. Fernald. Technical paper No. 9, U. S. Bureau of Mines, 1912. 42 pages, 6x9 in.

THE FACTOR OF SAFETY IN MINE ELECTRICAL INSTALLATIONS. By H. H. Clark. Technical Paper No. 19, U. S. Bureau of Mines, 1912. 14 pages, 6x9 in.

THE SLAGGING TYPE OF GAS PRODUCER, WITH A BRIEF REPORT OF PRELIMINARY TESTS. By C. D. Smith. Technical Paper No. 20, U. S. Bureau of Mines, 1912. 14 pages, 6x9 in.

THE SMOKE PROBLEM AT BOILER PLANTS. A PRELIMINARY REPORT. By D. T. Randall. Bulletin No. 39, U. S. Bureau of Mines, 1912. 31 pages, 6x9 in. Reprint of U. S. Geological Survey Bulletin, 334, revised by F. B. Slagg.

ANNUAL REPORT OF THE DEPARTMENT OF MINES, NEW SOUTH WALES FOR YEAR, 1911. 8x13 in. 219 pp. By W. A. Gullick, government printer.

Industrial Notes

The Dawson Coal & Coke Co., of New Mexico, have established a wholesale branch distributing office at San Bernardino, Calif. From this point the Dawson company's products will be distributed throughout the southern end of the state.

The Hess-Bright Manufacturing Co. has transferred its office to its new factory at Front Street and Erie Avenue, Philadelphia, Penn. Removal of the manufacturing department of the business will be performed progressively during the month of July.

Construction News

Spokane, Wash.—The Idaho Portland Cement Works has secured the cement deposits at Lime Point, on the Idaho side of the Spokane River, and has let a contract for the construction of a crusher plant at the property and a factory at this place. The Freeborn Engineering & Construction Co., of Kansas City, Mo., will construct the plant at a cost of \$678,500.

Bethlehem, Penn.—A new branch will be built by the Pennsylvania R.R., running from the main line to the Bethlehem Steel Works and the new \$6,000,000 coke oven adjoining. This will make the Pennsylvania a competitor with the Lehigh Valley, the Reading, Lehigh & New England, the Central of New Jersey, for the immense business of the Bethlehem Steel & Coke Co. The new road will be known as the Schuylkill & Lancaster R.R.

Louisville, Ky.—Another coal road has been projected for eastern Kentucky. It is the Knox Creek R.R., and will be built by a company of that name, which has been incorporated with \$50,000 capital stock. The road will be nine miles long and will run from the Kentucky-West Virginia line along Knox Creek to a point where the creek intersects the Kentucky-Virginia line. Headquarters of the company will be at Pikesville.

Du Bois, Penn.—Capitalists of this city, Brookville and Fall Creek, have been working since Mar. 1 on the organization of a coal company to open up the coal field of Ringgold Township. The company has applied for a charter which calls for the head office to be located at Falls Creek. The concern has options on 3000 acres of land and is at work drilling now. The mine will be opened at once.

Clarksburg, W. Va.—The Midland Coal & Coke Co., at Philippi, W. Va., has taken over the property of the Tygars River Coal Co. A central power station will be erected.

Pine Grove, Ohio—C. C. Smith, general superintendent for the new coal company here, has a force of men at work grading for the switch which will go up to the mine. It is the aim of the company to have four tracks and load 600 tons of coal daily. They will also run a tram to the D. T. & L. track and put up coal docks to coal the engine.

Petersburg, Ind.—Five-thousand acres of land have been leased by the American Coal Co., in Knox County, 8 miles north of this city, and a new shaft is to be sunk at Wheatland. Another railroad mine is being opened by Commodore Bugg, at Guddell station, on the E. & L. railroad, where 1000 acres of coal has been leased. Hundreds of acres of coal land have been leased by an unknown company west of Glen.

Mocanaqua, Penn.—The West End Coal Co. has broken ground for a large washery at the eastern approach of the Plymouth Bridge. The work is in charge of J. B. Fillmore.

Louisville, Ky.—A large coal- and ash-handling plant is being provided in connection with the new power plant of the Louisville Ry. Co. The Henry Vogt Machine Co., has been given the contract for the construction of the steel bins, which will hold the fuel and refuse. A tram-car system of handling will be used, and no mechanical conveyors will be installed.

Coal Trade Reviews

Current Prices of Coal and Coke and Market Conditions in the Important Centers

General Review

The general coal market, with the exception of anthracite, is so flat and dull that there is little or nothing to report. Bituminous transactions are down to about the lowest point of the year, but the short supplies of anthracite, together with the small arrivals, is still causing uneasiness in that branch.

Bituminous contract coal in the East is being taken sparingly, and cargo balances at distributing centers are moving off slowly; orders are more scarce than at any time during the season, and there is no relief in sight. The most noticeable feature in hard coal was the extremely light movement for June. This has been due to the urgent demand for line and Western shipments, these markets being quite insistent for the first month's mining. Many of the Eastern dealers are now entirely out of some sizes, and the pressure is strong for shipments out of New York and Philadelphia.

A better feeling has developed at some of the Eastern bituminous centers, although there is apparently no reasonable cause for this, other than the fact that the consumers who have been out of the market since the strike have about reached the end of their supplies and are now compelled to buy. There is also a steadily increasing consumption along with the rise in steel.

At Pittsburgh domestic business is down to almost nothing, and the Lake shipments, while improving, are still far from being up to expectations; labor is scarce and the car shortage unimproved. In Ohio there is continued activity in the Lake trade and larger tonnages are going into the steam markets. A heavy domestic consumption is anticipated soon, and should the expected car shortage materialize, a higher price level will be established.

The dumping at the Hampton Roads piers for June was the lowest for the year, but the market is normal and there is a steady movement at all points. The trade at Birmingham has maintained a satisfactory summer condition; furnace requirements have increased and will be still larger in August.

The Middle Western market is still depressed and considerable coal is piling up on demurrage. Few contracts are being closed because of the prevailing low prices in the spot market, particularly on screenings, for which the demand has been light.

Boston, Mass.

Bituminous is so flat in this market that there is really nothing to report. Prices are still nominal for there is no request from any of the large buyers. Those who have contracts are taking coal sparingly and cargo balances at distributing points go hard. Nothing seems to come of the reported efforts to curtail output in West Virginia. Shippers are still pressed with coal at the Hampton Roads piers, and orders are more scarce than at any time during this season, with no relief in sight. Georges Creek and the Pennsylvanias are in much the same situation, although prices are not affected to anything like the same extent. With Georges Creek it is a case of taking supplies on contract or not at all.

Anthracite is notable for the extremely light water shipments in June. Dealers in the East received a slim quota of their season supply and July will have to be a lot better or buyers will be getting worried. Retail trade usually starts in the latter part of July, and dealers have practically no stock in hand. There are many yards along the coast that are entirely out of certain sizes and the pressure is strong for shipments out of New York and Philadelphia. All rail, the trade is better cared for; but the inland points that depend on storage depots at distributing centers like Boston, Salem, and New Bedford are in straits. It is rumored that the line and Western points that have been so insistent for the first month's mining will ease up on their demands for a few weeks and allow a greater share to come to tide.

Prices at wholesale are about as follows:

Clearfields, f.o.b. mine.....	\$1.05@1.30
Clearfields, f.o.b. Philadelphia.....	2.30@2.55
Georges Creek, f.o.b. mine.....	1.52@1.62
Georges Creek, f.o.b. Philadelphia.....	2.77@2.87
Pocahontas, New River, f.o.b. Hampton Roads.....	2.50@2.60
Pocahontas, New River, f.o.b. cars Providence.....	3.30@3.40
Pocahontas, New River, f.o.b. cars Boston.....	3.40@3.50

New York

Anthracite—Contrary to usual at this time of year, the anthracite companies have few or no supplies on hand. The stove size is generally reported short, but none of the grades are easy. Prices are holding well up to the circular, with the exception of the steam grades, which may be selling off in some instances. It is generally reported that orders for rail

shipment have been placed up to September 1, but the tidewater demand is not so strong.

The heavy and insistent demand from the Western trade, which must be supplied while the Lakes remain open, has resulted in the Eastern consumers receiving less than their allotted proportion. The Western markets are now becoming well supplied and there will probably be heavier tonnages sent to the Eastern distributing centers from now on.

The prevailing anthracite prices in New York are now as follows, the L. & W. being at the upper ports and the L. & S. at the lower:

	L.&W.	L.&S.
Broken.....	\$4.80	\$4.75
Egg and stove.....	5.05	5.00
Chestnut.....	5.20	5.15
Pea.....	3.50	3.45
Buckwheat.....	2.75	2.45
Rice.....	2.25	1.95
Barley.....	1.75	1.70

Bituminous—The New York bituminous market is dull and entirely devoid of interest. The movement is confined entirely to contracts, any coal being sent in on consignment usually selling at prices less than the cost of production; especially is this the case with the lower grades, which as is usually the case in a market of this kind are extremely difficult to dispose of. There is evidence of more consumers getting into the market, however, and some of the larger companies believe that the next two weeks will see a decided improvement. Supplies at South Amboy are now about normal.

Prices continue about as follows:

West Virginia, steam.....	\$2.35
Ordinary grades, Pennsylvania.....	2.45
Fair grades, Pennsylvania.....	2.55@2.65
Good grades, Pennsylvania.....	2.70@2.75
Best Miller, Pennsylvania.....	2.95@3.00
Georges Creek.....	3.15

Pittsburgh, Penn.

Bituminous—Conditions in the coal market are not materially changed from last week. Domestic demand is almost nothing, and that from manufacturers has decreased slightly. Lake shipments, while heavier than a fortnight ago, are hardly up to expectations. Labor continues scarce and the car situation shows no improvement. Prices continue ragged. We quote the general market as follows, though these prices are frequently shaded: Nut, \$1.10; mine-run, \$1.15; ¾-in., \$1.35; 1¼-in., \$1.35; slack, 50¢ @ 75¢ per ton at mine, Pittsburgh district.

Connellsville Coke—The deadlock continues and the furnaces have not yet contracted for second-half coke. The operators improved their position, as noted in last report, by banking enough ovens to make up for the contracts which expired July 1, leaving the furnaces involved to buy in the spot market. Not a great deal of buying occurred, as the furnaces had in some instances already bought part of their requirements for July, but there was enough to maintain the prompt market at \$2.50, and we note sales since last report of 10,000 to 15,000 tons at about this figure, with more inquiry now out.

There has been no contracting in the past fortnight and the outcome of the matter remains in doubt. The charge was recently made before the Department of Justice that certain operators were maintaining a price agreement, contrary to law. While the charge has been denied it is no doubt very disconcerting to the operators involved to have such publicity attend their operations, whatever the legal status may be proven to be. We quote: Prompt furnace, \$2.50; contract furnace, \$2.50; prompt foundry, \$2.40@2.50; contract foundry, \$2.40@2.75.

The *Courier* reports production in the Connellsville and lower Connellsville region in the week ending June 29, at 393,640 tons, an increase of 20,000 tons, and shipments at 455 cars to Pittsburgh, 6236 cars to points west and 1405 cars to points east, a total of 12,096 cars, an increase of 732 cars.

Philadelphia, Penn.

Considerable surprise is being expressed in the coal trade at the way the business opened up for the month of July. Instead of cancellations, there seems to be a rather urgent need for the coal, and all of the wholesale operators are working their mines full. It is understood that the Eastern market, this refers particularly to New England, seems to be actually bare of fuel, and every cargo sent forward is speedily disposed of. The demand seems to be for all sizes, from broken up to and including chestnut.

The retail market in this vicinity is also taking a little spurt, many of the large dealers stating that they are receiving quite a number of orders at the July price, for shipment at their convenience, and they are taking advantage of the opportunity, now that coal is in fairly good supply, to cover these orders. Locally, however, the market seems to lack tone, the demand seeming to be confined to one size, that of stove; for the steam sizes, there seems to be very little call.

The bituminous-coal situation sees nothing favorable as yet. Movement at tidewater is very light, and the line trade is almost at a standstill; this refers to new business. Considerable coal is mov-

ing on contract, but even this is reported to be far less than the corresponding period of last year.

Baltimore, Md.

Although there was no apparent cause for it, a much better feeling developed in Baltimore trade circles during the past week, and one or two of the largest operators ventured the prediction that there would be a perceptible improvement in the demand before the end of July. They base this prediction on the belief that the end of the month will see a decided reduction of the stocks which consumers purchased a month or six weeks ago. These consumers have been totally out of the market during practically all of this time, so they cannot have much of a supply on hand, and consequently will soon have to purchase to meet their ordinary requirements.

Except for this change of sentiment in the trade, the local market was absolutely devoid of interest. The marked dullness, which has prevailed for the past three or four weeks, still envelops the market; prices are still way down; in fact, at the lowest level that they have been for months, and spot business has dwindled into nothingness.

The Keystone Coal & Coke Co. procured a contract from the United States Government during the week for furnishing 1600 tons of bituminous coal to the Baltimore Post Office. The coal is to be delivered during the fiscal year, which ends June 30, 1913.

The Western Maryland Railway Co. handled 89,000 tons of bituminous coal over its Port Covington piers in June, all of which represents deliveries made under standing contracts. The tonnage moved over the piers for May was 44,000 tons, or much less than for June.

Buffalo, N. Y.

There is no stir in the bituminous trade, but none is expected at this time of the year. If operators and dealers had made a fair spring profit there would be no complaint now, but with a market without profit since the little flurry in March it is hard to be obliged to wait till fall for better prices. There is a steadily increased consumption, along with the rise in steel, but the coal output is too large yet for the operators to realize any real benefit. There is a large supply of slack because of the Lake demand for three-quarter, so that grade is not in line to help out the trade as it sometimes does.

The stir in iron and steel has helped the coke trade very decidedly and there are little or no stocks of coke in the market. This is due in part to the scarcity of men at the ovens and it is to be hoped that the stir will extend to the coal side of the steel business before long.

Quotations remain without change, prices being weak for all grades of bituminous coal, as follows: Pittsburgh three-quarter, \$2.57½; mine-run, \$2.47½; slack, \$2.10, with Allegheny Valley 15 to 25c. lower. Coke is strong and advancing at \$4.50 for best Connellsville foundry; orders are being filled slowly.

There is all of the former brisk demand for anthracite and it is predicted that this will continue throughout the year as the anthracite companies are too far behind to catch up for six months at least. Oddly enough the demand for stove is much more insistent than for chestnut. In some instances that size brings more than chestnut, regardless of the difference of 25c. in favor of the latter on the regular circular.

Shipments by Lake for the week were 102,500 tons, being a rather small amount, considering that all the companies are now taking tonnage regularly.

Cleveland, Ohio

Conditions in the past week were unsatisfactory on account of the holiday, mills shutting down, and the little coal coming in was disposed of with difficulty. No. 8 slack is selling at \$1.30@1.35, Pittsburgh the same. Very little coarse coal is being shipped to this market, except on contract. There still remains a surplus purchased prior to the strike, and the demand is small.

The Lake ore movement continues active, but coal is not moving north as rapidly as it should, although a good supply has been shipped to this and other Lake Erie ports. Buyers are not ordering fast enough to suit operators, and in consequence an embargo will soon result if buyers do not open up soon.

Columbus, Ohio

Continued activity in the Lake trade, with a larger tonnage going into the steam business, are the features of the coal trade in Ohio during the past week. Prices are ruling firm at the circular which has been prevailing for some time and there is no indication yet of an advance in the list. But an expected car shortage and a better demand when the domestic trade opens may cause a strengthening, and prices are expected to advance some time next month.

Since the large railroad fuel contracts have been let, sales managers have been devoting their attention to the steam contracts. Some of the contracts are expiring at this time, although the majority were out about Apr. 1. There is some little stir in domestic circles, although no great disposition on the part of dealers to buy in large quantities.

The Lake trade is the best feature. Chartering of boats is going on actively and a large tonnage is going to the

Northwest. While a holiday broke into the week, the total tonnage loaded by the Hocking Valley docks, at Toledo, for the week ending July 5, was 91,500, as compared with 100,000 for the previous week. Since the opening of navigation the Hocking Valley docks at Toledo have loaded 992,000 tons.

The quotations in Ohio fields are:

Hocking Valley	
Domestic lump.....	\$1.50
2-in.....	1.35
Nut.....	1.15
Mine-run.....	1.15
Nut, pea and slack.....	0.55
Coarse slack.....	0.45
Pittsburgh No. 8	
2-in.....	\$1.15
Mine-run.....	1.05
Coarse slack.....	0.40
Pomeroy Bend	
Domestic lump.....	\$1.50
2-in.....	1.35
Nut.....	1.20
Mine-run.....	1.15
Nut, pea and slack.....	0.60
Coarse slack.....	0.50
Kanaucha	
Domestic lump.....	\$1.50
2-in.....	1.30
Mine-run.....	1.10
Nut, pea and slack.....	0.40
Coarse slack.....	0.30

Hampton Roads, Va.

The market here has been normal for this period during the past week, with a steady dumping over all three piers. The question of prices is little discussed, it being impossible to get a better figure than \$2.70, and shippers are reluctant about naming a lower one for fear of doing permanent injury.

Now that the June dumping figures are at hand it will be noted that it was the lightest month at all three piers since the first of the year. The Norfolk & Western Railway piers again lead, (but not with their customary proportion) with 426,171 tons, the Chesapeake & Ohio a little better than its proportion with 290,622 tons and the Virginian Railway with quite a satisfactory dumping of 175,731—a total of 892,524 tons or nearly 200,000 less than the previous month.

A large number of bottoms due for late June loading were delayed in reporting, thus failing to make the last week in the month as busy as predicted about the middle of June. It seems to be the consensus of opinion among local dealers that the poorest month of the year has passed.

Birmingham, Ala.

The coal market here is maintaining a favorable midsummer condition and the prospects for the late summer and fall are brightening. The summer demand for coal to be used by the cotton gins and mills is quite good. The iron furnace requirements have been increased during the week with indications that another furnace will be in blast by the middle of the month and perhaps two more some time during August.

The best indication that the iron furnaces will increase operations is that the

iron stocks are depleted, prices advancing steadily and a rare opportunity is afforded to sell a large amount of iron abroad at better prices than at home.

Important preparations are under way to put Alabama coal at New Orleans and displace the Pittsburgh product from that field. Dealers are confident of an increase in sales there during this year, although there has been a marked increase during the past year. Favorable contracts are being closed and altogether the outlook for Alabama coal is considered very good indeed.

Indianapolis, Ind.

There is little or no change here in the mid-summer coal industry. Business men refuse to get excited over politics and continue to predict a fairly good year for the mining and sale of coal.

The Indiana mines, with few exceptions, are all working full time, and the next pay day promises to be the largest since last April. Coal operators are more interested in demand and price of iron and steel than most any other commodity. There is a slight decrease in the manufacturing business, with the possible exception of the automobile trade.

Detroit, Mich.

Bituminous—Market conditions are becoming depressed again, owing to the fact that there is so much coal piling up on track which the shippers find it impossible to dispose of at the lowest possible margin. Slack is falling in price very rapidly, and is being quoted as low as 45c., with every indication of dropping below that point. Ruling prices are: Mine-run, 60c.; ¾-in. lump, 70c.; and 1½-in. lump 85c., on West Virginia coals f.o.b. mines. There are some Hocking coals arriving, but the demand on this product is very light and 25 cars were sold at 25c. a ton to one large consumer. Pittsburgh No. 8 Mine-run is quoted at 75c. and Jackson Hill lump at \$2.25 f.o.b. mines.

Anthracite—As small shipments of anthracite are now coming in, the market is weakening. Grate, egg and stove are quoted at \$7, chestnut, \$7.25, pea \$5.75, and buckwheat \$4.50 per ton, Detroit.

Coke—The coke market remains the same as the last week, the price being very firm. Connellsville foundry is quoted at \$4.85 net ton, and Semet Solvey at \$5, f.o.b. Detroit.

Chicago

The spot market for coal in Chicago is holding its own, and no more; no improvement has been noted in the buying of domestic sizes. As a result of a light demand and a fair supply the market for screenings has weakened, the price having been cut about 5c. a ton.

Smokeless lump and egg has shown

some strength, shippers asking from \$1.90 to \$2 a ton and being slow to take business at those prices. So far as western domestic coal is concerned, operators are shipping only to markets where they can obtain a good price. Additional strength is being noted in the anthracite market and it is expected that the volume of business for this month will fully equal that of a year ago. There is a good demand for both soft and hard coke.

Prevailing prices at Chicago are:

Sullivan County	
4-in. lump.....	\$2.47
Egg.....	2.37
Mine run.....	1.99
Screenings.....	1.72@1.82
Springfield	
Domestic lump.....	\$2.32
Steam lump.....	1.97
Mine-run.....	1.82
Screenings.....	1.62@1.72
Clinton	
Domestic lump.....	\$2.27
Steam lump.....	2.12
Mine-run.....	1.92
Screenings.....	1.67@1.72
Pocahontas and New River	
Mine-run.....	\$3.15
Lump and egg.....	3.95@4.05

Coke—Prices asked for coke are: Connellsville, \$4.85@4.90; Wise County, \$4.75; byproduct, egg and stove, \$4.65; byproduct, nut, \$4.55; gas-house, \$4.50.

Minneapolis—St. Paul

The coal situation in this territory has improved considerably during the past week. Even since the shutdown, trade has been very sluggish and the present call for business is welcomed by the wholesaler. The steam trade in the Twin Cities has been demoralized during the last three months and concessions have been made on this trade in the way of prices, but coal men think the crisis is here and everything will turn to a profitable and busy market.

The following are current quotations here:

	Docks	Twin Cities
Anthracite		
Grate.....	\$3.30	\$7.55
Egg.....	6.55	7.80
Stove.....	6.55	7.80
Nut.....	6.80	8.05
Pea.....	5.50	6.75
Buckwheat.....	3.75	5.00
Voughiogeny		
Lump.....	\$3.40	\$4.39
Stove.....	3.40	4.30
Dock-run.....	3.00	4.00
Screenings.....	2.40	3.30
Hocking		
Lump, stove or nut.....	\$3.40	\$4.30
Dock-run.....	3.00	3.90
Screenings.....	2.25	3.15
Splint		
Lump or stove.....	\$3.40	\$4.30
Dock-Run.....	3.10	4.00
Smokeless		
Lump, egg or nut.....	\$4.50	\$5.40
Screened (mixed) egg and lump.....	4.25	5.15
Mine-run.....	3.15	4.05
Screenings.....	2.75	3.65
Cannel.....	5.75	
Smithing.....	4.25	

Retailers in the Twin Cities are doing practically nothing, which is the reverse

from this time last year. Consumers usually lay in supplies in April, May and during the summer months, but this year they will hold off until September or October.

St. Louis, Mo.

The St. Louis market is decidedly quiet on everything but anthracite, which is in good demand; as a matter of fact, the demand for this grade exceeds the supply, and in the country districts it is not a hard matter to get a premium on immediate shipments. Illinois coals are still dragging along at a figure slightly under the cost of production, but indications are that they will soon improve. There is a fair demand for West Virginia smokeless, and Arkansas semi-anthracite is moving in, in better volume than for over a year.

Among the retailers, a price-cutting war has started on the Standard coals. The prevailing price for some weeks was 9½c. delivered. One of the large retailers a few days ago came out with a price of 8½c. per bushel delivered, and is advertising it extensively.

The prevailing prices are:

Franklin County	
6-in. lump and 3x6 egg.....	\$1.35@1.50
Nut.....	1.35@1.50
No. 2 nut.....	1.25@1.35
Screenings.....	0.90@1.00
Cartersville	
6-in. lump and 3x6 egg.....	\$1.20@1.35
Nut.....	1.15@1.25
Screenings.....	0.90@1.00
Mine-run.....	1.05@1.10
Mount Olive	
Lump.....	\$1.15@1.25
Nut.....	1.00@1.10
Screenings.....	0.90@0.95
Standard	
2-in. lump.....	\$0.85@0.95
6-in. lump.....	0.90@1.00
Screenings.....	0.85@0.90
Mine-run.....	0.85@0.90
Anthracite	
Chestnut.....	\$7.25
Egg and stove.....	7.00
Grate.....	6.75
New River and Pocahontas	
Lump.....	\$4.50
Egg.....	4.40
Gas House Coke.....	4.50@4.60
By product coke.....	4.60

Portland, Ore.

The situation here remains unchanged, with only a slight demand, owing to the season of the year, and an abundance of coal coming in from the Washington and Wyoming mines. Higher grade lump is quoted at \$10 with the low grades selling at from \$6 to \$7.

No Australian coal is being imported owing to the high freights, due to a scarcity of vessels. There is every reason to suppose that importations from Australia this year will be very light, if there are any at all; so far no vessels have been engaged for this class of business. There is a good deal of Australian coal here in storage, left over from last season.

Production and Transportation Statistics

VARIOUS RAILROADS, RIVERS AND CANALS

The following is a comparative statement of the fuel movement over various railroads, rivers and canals for April, 1911-12:

Railroads	1911	1912
Baltimore & Ohio ²	2,637,255	2,698,265
Buffalo, Rochester & Pittsburgh ³	620,896	422,081
Buffalo & Susquehanna ³	124,557	22,104
Chesapeake & Ohio ² ⁴	1,138,669	1,537,047
Erie ⁴	734,523	854,223
Huntington & Broad Top Mountain ² ³	85,264	99,953
New York Central & Hudson River ³	600,641	449,723
Norfolk & Western ² ³	1,513,857	1,979,900
Pennsylvania (East of Pittsburgh & Erie) ² ³	5,219,785	4,661,896
Pittsburgh & Lake Erie ² ³	1,142,632	722,523
Pittsburgh, Shawmut & Northern ³	128,803	55,358
Southern ³	305,495	376,616
Virginian ³	193,661	280,995
Western Maryland.....	213,186	260,295

Rivers and Canals	1911	1912
Barren River, Lock No. 1.....	42	128
Black Warrior River, Lock No. 12.....	462	1,395
Canal and Falls at Louisville.....	240,895	42,833
Chesapeake & Delaware Canal.....	11,024	2,834
Davis Island Dam.....	430,090	67,975
Green River, Lock No. 1.....	3,696	912
Kanawha River.....	133,360	87,200
Kentucky River, Lock No. 1.....	9,600	7,203
Monongahela River.....	814,444	370,653
Chesapeake & Ohio Canal.....	25,858	21,535

¹Figures throughout this table have been reduced to a uniform basis of short tons.

²Includes coal received from connecting lines.

³Includes company's coal.

⁴March and months' figures.

⁵Does not include company's

LAKE SHIPMENTS

The Department of Commerce and Labor reports the Lake coal shipments for May as follows:

The domestic shipments of coal on the Great Lakes during May, 1912, aggregated 2,444,889 short tons, a slight decline when compared with May, 1911. Of these shipments 85,537 short tons were hard coal, 2,101,710 short tons soft coal, and 257,642 short tons were bunker coal supplied to vessels in the domestic trade. Over 92 per cent. of the soft coal was shipped from Lake Erie ports, mainly from Toledo, Ashtabula, Lorain, Cleveland, and Sandusky. Of the soft-coal shipments, 1,115,847 short tons were shipped to domestic ports on Lake Superior, 728,516 short tons to Lake Michigan ports and 85,433 short tons to Lake Huron ports.

DOMINION COAL CO.

Company's production for 25 working days in June totaled 391,889 tons, an increase of 3000 tons over the 26 days worked in May and establishing a new high record.

ANTHRACITE SHIPMENTS

The following is a comparative statement of the June anthracite shipments for 1911 and 1912:

	1912	1911
Philadelphia & Reading.....	1,174,452	1,135,749
Lehigh Valley.....	1,175,688	1,214,832
Central R. R. of N. J.....	859,788	876,579
Del., Lack. & Western.....	836,365	906,722
Del. & Hudson.....	670,331	604,055
Pennsylvania.....	555,674	481,004
Erie.....	708,906	783,083
Ontario & Western.....	227,224	213,313
Total.....	6,199,428	6,215,357

Foreign Markets

FRANCE

The following is a comparative statement of fuel imports and exports from France during the first 4 months of 1911 and 1912:

Imports:	1911	1912
Coal.....	5,562,300	4,459,900
Coke.....	832,900	857,500
Briquettes.....	397,900	362,600
Exports:	1911	1912
Coal.....	427,828	755,200
Coke.....	55,807	54,791
Briquettes.....	37,196	69,701

GREAT BRITAIN

For spot loading sellers are still making concessions, but there are prospects of a busier market. Prices are approximately as follows:

Best Welsh steam coal.....	\$4.14
Seconds.....	3.84
Thirds.....	3.60
Best dry coals.....	4.20
Best Monmouthshire.....	3.66
Seconds.....	3.54
Best Cardiff small coal.....	2.34
Seconds.....	2.12

The prices for Cardiff coals are f.o.b. Cardiff, Penarth, or Barry, while those for Monmouthshire descriptions are f.o.b. Newport; both exclusive of wharfage, and for cash in 30 days, less 2½ per cent.

Financial Notes

Lehigh & Wilkes-Barre Coal Co.—The net profits of this company during the past five years have averaged 21% on its \$9,212,500 capital stock.

Sheridan Coal Co.—The \$24,000 first mortgage 6% bonds of this company, dated June 11, 1903, for payment at 106 and interest, have been called and will be paid on June 30 by the Union Trust Co. of New York.

Nova Scotia Steel & Coal Co.—Some years ago this company transferred \$75,000 to a special reserve fund to meet possible mining accidents. Sufficient of this amount to cover the actual cost of restoring No. 3 colliery to the condition in which it was previous to the explosion in January, 1911, was used for that purpose. The total reserve funds now aggregate \$1,835,522, and with the balance to the credit of profit and loss, amounts to \$2,344,067.

Alabama Consolidated Coal & Iron Co.—Following the failure of the merger between this company and the Southern Iron & Steel Co., negotiations for which were started about a year ago, receivers have now been appointed for the Alabama company. Under the merger plan of these two companies provision was made for raising \$4,000,000 to put both companies on their feet. Harvey, Fiske & Son estimated it would take more than that, probably \$8,000,000, to rehabilitate the property.

Reading Co.—Railway receipts of this company for the month of April during the strike were nearly \$1,000,000 less than the corresponding month of last year. The coal company earnings were but \$903,000, a loss of \$3,885,000. The net earnings of this company in April were \$369,000, a decrease of \$1,365,000. Up to the beginning of the strike the coal business was more profitable than for corresponding periods in 1911, so that at the end of April the company had a surplus of \$7,489,000, an increase of \$991,000 for the ten months.

Throwing The Searchlight On Advertising

Little Talks on a Big Subject for Coal Age Readers

By the Ad. Editor

We have been telling you that you owe it to yourself to read the ads. in your paper.

That it is highly important for you to keep abreast of the things advertised.

And that advertising saves *you* a lot of time and money.

* * *

Now look at it this way for a moment:—

Suppose there was no such thing as advertising—

Suppose that every new breakfast food, or tobacco or machine had to be introduced to you by personal salesmen—

What would happen?

Well, in the first place, it would be perhaps several years before you would know such articles could be bought.

It would be longer still before you would know very much about them.

They would cost you a whole lot more than they do now—

Because it would cost the manufacturer so much more to market them.

* * *

Here's the idea—

Advertising announces, teaches, informs, illustrates and then *sells*.

It is universally used because it does all those things better, quicker and cheaper than they can be done any other way—

All of which means that the buyer learns more about manufactured products—

Learns it quicker—

And therefore is able to buy them cheaper.

* * *

You know, a few years ago,

a Senate committee got itself laughed at by the whole country—

By suggesting that advertising was one cause of the high cost of living—

Really, of course, advertising is doing more than any other one force to keep the cost of living down.

And this is one more big reason why it pays to read the ads—

And *buy* advertised goods.

By so doing you go a long way toward keeping yourself abreast of the times—

And you easily, quickly absorb a knowledge that enables you to buy for yourself—

Or for your mine—

With greater wisdom and protection.

* * *

You can't study the ads in any good technical paper without learning something valuable—

Try it on this issue of Coal Age.